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VOL. XLV. NEW YORK—THURSDAY, DECEMBER 15, 1921 No. 24

Sound Tariff Principles Warrant Support of Industry

Tariff Principles Committee of U. S. Chamber of Commerce has made seven recommendations which are of vital importance to automotive industry. Adoption would aid the industry directly in foreign trade and indirectly in domestic sales.

By Norman G. Shidle

THE automotive industry is dependent upon general industrial conditions. And general industrial conditions are closely related to tariff problems. Thus the automotive manufacturer is vitally concerned with the application of sound principles to tariff adjustment, even though the direct effect of tariff is less on his industry than on many others.

As the second largest industry in the country, the automotive industry is vitally concerned with any question which affects the economic development and progress of the nation and of the individual manufacturing organizations which comprise American industry. As an unsettling factor in the business world, the tariff is probably without serious rival for premier honors. It has been said that back in the '80s and '90s business was almost forced to take a vacation two years out of every four: one year preceding every election to wonder what was going to happen to the tariff and one year following every election to wait for it to happen.

The political character of our tariff causes similar unsettled business conditions even at the present time, and automobile manufacturers are definitely concerned in any constructive effort to alleviate this situation. If tariff questions were out of politics, general business conditions would fluctuate less violently and would not be unsettled with every presidential election. The prosperity of the country would be enhanced, through more constant production and industrial effort, and the market for automotive products would be easier to predict and less difficult to sell.

The importance of foreign trade to the automotive industry adds greater weight to the tariff problem, viewed from the automotive standpoint. Feeling the necessity for foreign trade opportunities to be more important than the exclusion of foreign competition in this country, the N. A. C. C. recommended lower duties on automobiles than were contained in the previous tariff law, and as a result succeeded in getting the former schedule of 40 per cent reduced to 25 per cent in the bill that has been under consideration in Washington for the last eight months. The tariff bears more directly upon the automotive industry in its effect upon foreign markets than in any other way, but the extreme importance of the indirect in-

fluences pointed out, renders the question one of immediate concern to every manufacturer.

Consequently, the recent report of the Tariff Principles Committee to the Board of Directors of the Chamber of Commerce of the United States should be carefully examined by executives throughout the industry. Its acceptance by the Chamber and subsequent adoption by the government would effect a stabilization in business and an ultimate economy in the carrying on of industry that would almost equal in scope the results of the disarmament conference, should that conference fulfill the best hopes of the nation.

The Tariff Principles Committee was concerned, not with attempting to write a new tariff bill, but with outlining the fundamentals upon which sound tariff legislation should rest and the principles which should be applied in "taking the tariff out of politics" and making it function for the best interests of American business and industry. The committee made seven recommendations.

The first recommendation is "that tariff legislation should be so framed by Congress as to permit subsequent adjustment of individual rates or particular schedules of rates within prescribed limitations, and authorize changes therein from time to time without general revision of the tariff; that reasonable latitude in the application of tariff rates to any commodity, or group of commodities, be provided for, in order that there may be flexibility in the adjustment of said rates to the varying fluctuations of industrial and trade conditions."

AUTOMOBILE and truck sales depend primarily upon the normal and continuous functioning of business. The application of sound economic principles to tariff would go far toward reducing industrial fluctuations. Every executive should examine carefully the proposals of the Tariff Principles Committee of the U. S. Chamber of Commerce. This committee has not been concerned with writing a new tariff law, but only with the principles upon which sound tariff action should be based. The recommendations have been put to a referendum of the members of the national body.

The second recommendation is closely allied with the first, so that the two may be discussed simultaneously. It is as follows:

"That tariff legislation should provide for and create a Tariff Adjustment Board, appointed by the President and confirmed by the Senate, with such emolument and tenure of office as will remove the members from political influence and personal interests; that this Board shall be separate and distinct from the United States Tariff Commission, the duties of which should be modified to require report of its investigations to the Tariff Adjustment Board in addition to the reports it now makes."

The adoption of these two recommendations would mean that the setting of tariff rates would be in the hands of a board of impartial experts. The responsibility for the actions of the board could be definitely fixed in a way that is utterly impossible as regards Congress. The responsibility for the appointment of men to the board would reflect credit or discredit very readily upon the President and this in itself would go far toward assuring the appointment of a capable and impartial board. The Interstate Commerce Commission furnishes an example of the possibilities of a non-political body of this kind and indicates the practicability of the recommendation.

The idea is that Congress would simply indicate in the tariff bill certain wide limits within which the board would have power to adjust duties. It would be necessary to make these limits wide enough that the board would have a considerable degree of power; otherwise the plan would be rendered ineffective. It would be necessary, of course, to guarantee the country against continual change of tariff rates at unreasonable short intervals. The committee has recognized this fact by recommending that Congress specify that any rate established is not subject to change within a fixed period from the date when it becomes applicable.

President Harding endorsed the principle of a flexible tariff in his recent address to Congress when he said: "Doubtless we are justified in seeking a more flexible policy than we have provided heretofore. I hope a way will be found to make for flexibility and elasticity, so that rates may be adjusted to meet unusual and changing conditions which cannot be anticipated."

His method of providing this flexibility, however, is somewhat different than that recommended by the committee of the Chamber of Commerce. The Smoot amendment, introduced immediately after the President's address, embodies the latter's ideas along this line:

This board, proposed by the committee, operating as outlined, would eliminate the necessity of constantly writing new tariff bills, would take away the uncertainty concerning tariff now prevalent at every election, and would allow American business to continue its normal course unaffected by political considerations of tariff legislation.

Even more important, however, it would make possible the ready adjustment of tariff schedules to current conditions. Under present methods a tariff measure is very likely to be entirely out of date, so far as its usefulness is concerned, by the time it has made its way through the toils of political debate into the final form of a law. The recent emergency tariff measure furnishes an excellent example of such a measure. As President Harding said in his message, "A rate may be just to-day and entirely out of proportion six months from to-day." The method recommended would enable us to have a tariff constantly fitted to current conditions, regardless of the degree of fluctuation in economic and business movements.

Further analysis shows such a board to have other important potential functions. It might save manufacturers a great deal of money very directly by eliminating the usefulness of or the necessity for expensive lobbies. Where there are two conflicting industrial interests, the board might call them together in conference and get something like the real facts of the case upon which to base an intelligent decision; it might even get the opposing interests to render a joint compromise proposal. In other words, the board might function to some extent as an arbitration body on tariff matters. This phase is not suggested in the report of the committee but would seem to be a perfectly possible and logical development were the recommendations of the committee carried out.

In its third recommendation, the committee advocates reasonable protection of American industries that are subject to destructive competition from abroad and states that "there must be protection against emergency prices and emergency conditions that may prove destructive." It further states that "there is no thought of urging a Chinese wall type of protection nor a policy of attempting to foster any and every industry that may be started on American soil."

A fourth section recommends the maintaining of anti-dumping legislation now on the statute books. This

should meet with the entire approval of the automotive industry, especially as regards reimportation of goods originally manufactured in the United States. The Graham resolution, which according to latest reports will place a duty of 90 per cent on such goods, will take care of the immediate needs of the automotive industry in this respect—provided it is passed, as now seems likely. The general principle enunciated by the committee, however, should be supported by the industry for more permanent protection.

The fifth recommendation of the committee deals with the framing of tariff legislation with a view to encouraging our foreign trade. In addition to recommending this practice, the committee practically indorses the provision in the tariff bill at present under discussion which gives to the President bargaining powers as regards tariff treaties with various countries. This would enable the President, for example, to force Canada to give us cheap wood for wood pulp if we are to give Canada cheap coal.

The automotive industry has been among the first to recognize the direct relation between domestic tariff and foreign trade and to attempt to have the two correlated in practice. It has recognized the necessity of having a domestic tariff calculated to promote the goodwill rather than the enmity of foreign countries if American products are to be successfully sold abroad.

The committee recommends that the "American valuation plan" not be adopted. Space is lacking for a full discussion of the pros and cons of this particular question, but a close analysis of the problems indicates that there is little question but that the "American valuation plan" would fail to work for the best interests of American industry.

The final recommendation favors "the postponement of a general revision of the United States Tariff until conditions in international trade and finance are sufficiently stabilized to form a basis for legislation possessing permanent value."

The recommendations of this committee are the result of a study which has been carried on for over a year by a group of the most able business men in the country. A thorough analysis of the proposals, together with an examination of their importance to the automotive industry, brings out forcibly the benefits which would accrue to manufacturers through their adoption. This result cannot be obtained without considerable pressure from business. By putting its whole weight behind these recommendations, the automotive industry can perform a very real and practical service for itself, for the industries which contribute to it, and for American industry as a whole.

Motor Vehicles in the Postal Service

A GENERAL survey of motor transportation in the Post Office Department has shown the desirability of reducing the number of trucks to eight standard types, which are economical and especially suitable for the service. In his annual report to the President, Will H. Hays, Postmaster General, declared that standardization of equipment will contribute to better service at a substantial reduction in cost.

A statistical study of the Government-owned motor-vehicle service to determine the cost of operation per mile and per hour and miles per gallon of gasoline for the fiscal year of 1921 shows how various trucks and cars perform in the strenuous work of the postal service. A well-known model with ⅜-ton capacity costs 17 cents per mile without driver; 31 cents with driver; 71 cents per hour without driver; $1.32 per hour with driver, and travels 8.1 miles per gallon of gasoline. Three standard makes of trucks of ½-ton capacity showed varying costs. One cost 20 cents per mile without driver; 91 cents per hour without driver, and traveled 8.5 miles per gallon of gasoline. Another of the same capacity cost 34 cents per mile without driver; $1.11 per hour without driver, and traveled 4.7 miles per gallon of gasoline. Another truck with the same carrying capacity cost 31 cents per mile; $1.18 per hour without driver, and made 4 miles per gallon. One model truck with a capacity of 1 ton cost 18 cents per mile without driver and another of the same carrying weight cost 31 cents. The former got 7 miles per gallon and the latter 3.9 miles.

A similar study of Government-owned motor trucks operated 16 hours a day for 365 days a year showed the rate of depreciation for a year. The smaller type, with a capacity of 750 lb., depreciated 25 per cent, while three trucks of popular make, having a carrying capacity of 1000 lb., showed a depreciation of 33 1/3 per cent for two models and 25 per cent for another model.

The depreciation for the trucks having a carrying capacity of 3000 lb. or more averaged 20 per cent.

During the fiscal year 1921 Government-owned motor-vehicle service was extended to 42 additional cities in lieu of contract service, making a total of 262 cities where Government-owned motor-vehicle service was in operation wholly or in part. This service involved the use of motor trucks of from ⅜- to 5-ton capacities.

The expenditure for this class of service during the fiscal year was $11,777,842, being an increase of $2,974,688 over that for the preceding year.

Collection and delivery of department store parcels was inaugurated during the year in one city and the success attending the initial effort in this direction resulted in a demand for similar facilities in many large cities. It was found impracticable to make collection of such parcels except from classified stations, but the delivery feature was rapidly extended, and has resulted in a saving to the merchants, as well as considerable revenue to the department.

The use of motorcycles in the delivery and collection of mails, where feasible, is being continued.

S. A. E. Tachometer Standard Revised

REVISIONS in the present S. A. E. Standard for Tachometer Drive has been recommended by the Aeronautic Division of the society. An increase in the diameter of the driving shaft from 0.152 to 0.187 in. is recommended, as is an increase in the diameter of the hole for the driving shaft. This would be increased from 0.161 to 0.191 in.

These revisions are recommended because experience has indicated that the present standard dimensions for the shaft connection on the engine end are not of suitable proportions to insure freedom from trouble. This is especially true in the operation of the centrifugal type of tachometer, which turns faster than indicated speed. Breakage has been known to result through use of the present dimensions, even though special alloy steels have been used for the shaft.

The recommendations will be acted upon at the next meeting of the Standards Committee on January 10.

Need for Fuel Research Shown at Petroleum Meeting

Understanding of difficulties faced by both the automotive and petroleum industries is leading to a praiseworthy disposition to co-operate. More research and education are needed and a demand for more economical engines becomes increasingly apparent. Must face higher fuel prices.

By Herbert Chase

IT is almost past understanding how two of the country's greatest industries, each very largely dependent upon the other for prosperity, if not for very life, could have grown up in this country with but slight recognition of their mutual dependence or need for co-operation. Such, however, is the case. A condition of this kind could not continue indefinitely. The war taught the need for industrial co-operation, and the beginning of such co-operation between the automotive and the petroleum industries occurred in a small way shortly after the war. The seed planted at that time is now starting to germinate, but it has not yet borne fruit.

The annual meeting of the American Petroleum Institute, which took place in Chicago last week set a promising and commendable precedent by arranging for joint sessions in which the technologists of the petroleum industry met members of the Society of Automotive Engineers. It was the first general gathering of men from the two industries and afforded a splendid opportunity for discussion of their mutual problems.

It should be said to the credit of the Society of Automotive Engineers that the meeting was brought about through its efforts and an appreciation of its members of the need for better mutual understanding between those who produce the fuel, on the one hand, and those who build equipment which uses the fuel, on the other.

Apparently few of the petroleum representatives realized why it is becoming increasingly difficult to use present-day motor fuels. For the first time the petroleum industry as a whole established close relations with those who represent their greatest customers and got from them an expression of what the customers' real needs are.

There was general agreement that the user of automotive equipment should be given the most possible for his money in service from the fuel. The automotive men expressed their views as to how this can be done and a willingness to adapt the engine to the fuel as well as possible, but also suggested the desirability of better fuel. Petroleum men, in general, had little to say about the possibility of providing better fuel. Few, in fact, appeared to realize the need or the possible advantage, either to themselves or to the public, of better fuel.

So it appears there is great need for co-operative education regarding the true fuel situation.

When the steel producers found, years ago, that ordinary steels were not satisfactory for most automotive purposes they set about the development of better ones, and have increased their output enormously thereby. Not so the producer of motor fuels. The demand has increased, in spite of poorer quality, and the onus has been placed upon the automotive manufacturer to adapt his product to the use of the fuel made available. There are many reasons for this, some of them apparently beyond the control of the fuel producer, but it does not follow that conditions could not have been changed had the oil producer sought with energy to improve fuels by employing better refining methods. There are still, in fact, great possibilities in that direction which should be sought through thorough and extensive research. Such research must be vigorously carried on.

To date the fuel producer and refiner have sought to increase motor fuel output chiefly by seeking new oil resources, but for many years the supply has failed to increase as rapidly as the demand, so there is evident need for improved yield of gasoline from the crude. Unless the automotive industry asserts itself forcibly the increased supply will be secured simply by cutting deeper into the crude; that is, by furnishing less and less volatile fuel, and thus placing greater burdens upon the vehicle user and manufacturer.

The situation is, in fact, none too encouraging from the automotive viewpoint. For many reasons the oil man hesitates to admit a future shortage of petroleum even in this country. He has always got more oil by more drilling and wildcatting, but has for several years steadily lost ground in reference to the demand, domestic fields alone considered—a fact which he is prone to forget. Mexico has been making up the deficiency.

The recent American Petroleum Institute meeting heard again the same old story that there will always be an adequate petroleum supply, but it is more frequently qualified by saying, "If America is willing to pay the price she will get her share." "Mexico will continue to supply oil." "Other South and Central American countries have great reserves," and other like statements which are more or less true, but fail to make it clear that motor fuel is going to cost far more in the future than in the past.

There was but little inclination at the meeting to discuss the Mexican oil situation, but, as we reported last week, Sinclair admitted that it is serious, that we cannot afford to neglect consideration of what will occur if 20 per cent or more of our supply of crude is cut off by failure of present Mexican fields.

Two things become increasingly evident. The first, that the automotive industry must expect to face considerably higher prices for fuels, and, second, that every effort must be put forward at once to develop engines which will be more efficient and at the same time use less volatile fuels.

A Semi-Racing Roadster Body of New Design

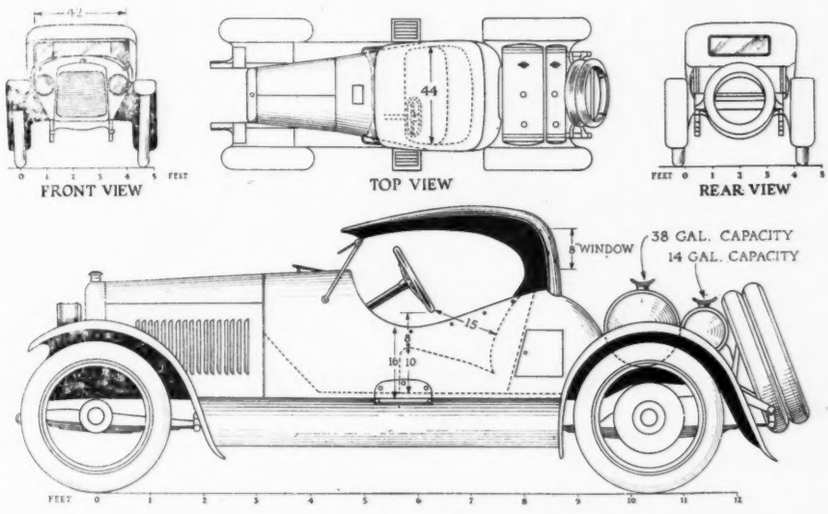
It is provided with a permanent top with a rear window which can be easily lowered. A large luggage space with openings at each side is located within the body just aft of the seat. No entrance door necessary.

By George J. Mercer

NEW roadster body models are sharing with touring bodies in the tendency toward more comfortable seating arrangements, including higher sides and seat backs. There is also a continued change toward cycle-type mudguards and side steps without running-boards, and larger windshields with wing attachments.

The design shown in the accompanying cut is of the semi-racing type—a model intended for those who enjoy driving at high speed. Bodies of this type are seldom equipped with a top on account of the wind resistance it offers and the unpleasant eddies which it creates.

To minimize these objections the top in the design here shown is made permanent and is carried further back beyond the seat than usual, thus allowing space at the rear of the passengers. A large window which can be let all the way down allows for the escape of the air which otherwise creates pressure under the top. This window is made to operate in a runway in the same manner as closed body windows, but it is smaller than most such windows. It is operated with a lift strap and rests on the fence when up.



Four views of a new design for a semi-racing roadster body

The windshield is wide, having a 42-in. glass, which comes well down on the sides of the shroud to afford better protection. The upper part is movable, but the lower is stationary. The lower glass is split in the center to avoid likelihood of breakage. A ventilator is used on top of shroud, and the front end of the top which extends forward of the shield is tapered from the underside up, the reverse of ordinary practice. This makes the top end look thin and also gives a wide angle of vision.

Ordinarily the type of body here shown is made with bucket seats set on the frame, the tanks and tires filling the remainder of the space at the rear. One reason for presenting the cut here shown is to illustrate another and more finished design. The body includes luggage space, but is short to allow space for the tanks at the rear. Nevertheless the locker space provided back of the seat is commodious and readily accessible from each side.

The shape of the top also differs from common practice, but since it is a permanent structure, greater latitude is permitted than with the folding type. When we do not have to fold the top down, there is no logical reason why it should be made with the restrictions that the folding type entails. A car of any description needs a top. In the summer it often happens that the seat cushions will be uncomfortably hot after the car stands in the sun for even a short time, while the entire interior as well as the passengers require protection in case of a storm. Since the top is seldom folded, it seems logical to make it stationary, and provide a ventilating window at the rear if the seat is far enough forward to escape the tail dust.

The body shown is made without doors. The height of the body side above the step is 16 in. To make it a ladies car, one door can readily be placed on the right side.

While the use of the roadster is not as great as it was when the automobile was looked upon merely for pleasure purposes, there will always be the class of buyers who want this type of body. This is especially true among young men who have opportunities to become car owners, and in many cases roadster bodies are being fitted to used chassis for this type of purchaser. The design presented herewith is one that is believed to be suited for this use. It offers a chance for the amateur to build his own body for a second hand car, and while the individual may have tastes somewhat different from the design submitted, it is believed that from the diagrams he could work out his ideas along the lines suggested.

The car manufacturer can also gain from a study of this design some of the principal features which are believed would be desirable to include on a roadster body. Many improvements would probably be made by different manufacturers, but the basic idea is one that includes most of the features that are especially desired by the purchaser of this type of car.

The Paris Aeronautical Exhibition

Seventh annual show is made up almost entirely of planes manufactured in France. One Dutch and two Italian makers enter field, however. Chief interest was in the several commercial planes exhibited.

FRANCE is holding its seventh annual aeronautical exhibition in the Grand Palais, at Paris, the scene of the recent automobile show. Theoretically international, the exhibition is practically all French, for of the 20 makers showing 35 types of airplanes (Government-owned military machines excluded) there are two Italians (Ansaldo and Ricci), and one Dutch, the rest being purely French firms. England is indirectly represented by a Vickers-Vimy plane built in France under license.

The presence in the show of the Dutch firm, N. V. Nederlandsche Vliegtuigfabrik, and of its chief engineer Herr Fokker, has given rise to a vigorous protest on the part of French manufacturers and aviators.

French Makes Predominate

Of the 35 planes in the Grand Palais, 30 are French construction, 2 are built by the Italian Ricci Co., and one each are by Ansaldo, of Turin, the Dutch Fokker Company, and the French Vickers Company. There are three triplanes, five monoplanes, and 27 biplanes. Of the triplanes two are Italian Ricci single-seat, cheap, sporting type machines and one the Besson flying boat. In the monoplane section Morane exhibits two of his parasol type planes; Lioré-Olivier has an all-metal scout machine and Hanriot also an all-metal special scout machine.

Commercial aviation is the dominating feature of the show, and although military machines are exhibited they are to be found only on the French Government stands, and not among planes shown by manufacturers. The industry has shrunk since 1918, as is shown by the presence of only 17 French makers of airplanes, of which the following is the list: Farman, Bleriot, Besson, Breguet, Nieuport, Mureaux, Caudron, Sanchez-Besa, F.B.A., Hanriot, Levassor, Lioré & Olivier, Morane, Potez, Tampier, Latecoere and Astra. Very few of these are occupied exclusively on aviation.

In the aviation engine section there are no exclusive makers of airplane power plants. The exhibiting firms comprise automobile manufacturers who maintain an aviation engine department, among them being Renault, Lorraine-Dietrich, Hispano-Suiza, Talbot-Sunbeam, and Peugeot, and makers who during the war were exclusively engaged on aviation engines but since then have had to take up other branches of engineering. These latter are Salmson, Gnome & Rhone, and Anzani. The Farman Company now builds both engines and planes, and the Breguet Company has taken up the construction of the Bugatti 16-cylinder engine for its airplanes. Airplane construction in France is being reduced to a small number of specialized firms having either none or only an indirect interest in the automobile industry, while aviation motor construction is being continued by a few makers who have specialized in this type of engine.

Big capacity commercial planes and all-metal construction are the features of the exhibition. Farman has the biggest plane in the show, this being a biplane with four Lorraine-Dietrich engines of a total of 1400 hp. driving two tractors and two pusher screws. The plane has a total weight of 10 tons, of which, 4.8 tons comprise useful load. Its wing spread is 114 feet, its length 69 feet, and height 26 feet. Total wing area is 3229 square feet.

Breguet exhibits his Leviathan Type XXI all-metal plane in which duralumin is almost exclusively employed. In addition to the unfinished exhibition machine a finished duplicate is at the factory ready to undergo its trial flights. This biplane weighs 3 tons empty and has a load capacity of 3½ tons, with a speed at an altitude of 6500 feet of 105 miles an hour. Its range of action with a useful load of 2½ tons is 380 miles, and with a useful load of 2 tons 685 miles. The Breguet Leviathan is fitted with two 16-cylinder engines built in the Breguet shops to Bugatti designs; the two engines, which develop a total of 900 hp. drive a single tractor screw. One of the features of the new Breguet is the use of sheet aluminum for covering the wings. This is not employed in single sheet form, but in strips of 5 inches in width extending from the leading to the trailing edge. The edges of each strip are carried round and riveted to a metal rib. This type of construction has already been employed for the covering of fuselages, but its use is new for wings, and has not yet been experimented with in the air. Experience has shown that with unbroken sheets of aluminum as a wing covering there is a tendency for the metal to fracture in use; it is believed this will be overcome by the use of strips, and as the thickness of the metal is only half a millimetre weight is less than with linen covering.

Another All-Metal Plane

Another all-metal construction is shown by the Latecoere Company, a concern which builds as well as operates airplanes. This firm exhibits the fuselage of a day bomber constructed entirely of duralumin. The complete wings are not shown, but it is stated that these will have metal covering. The plane has a wing spread of 86 feet, length 50 feet, height 20 feet and total weight 5-1/10 tons. The plane will be driven by four engines developing 1000 hp., and will have a speed of 142 miles an hour. A new big commercial plane by the same company is of duralumin construction with fabric covering for the wings. This machine, which is designed for 20 passengers, has a wing spread of 80 feet, length 46 feet, height 20 feet, and weighs 7 tons complete. It is driven by three Salmson water-cooled engines, with tractor screws.

Bleriot has also a 20-passenger plane of wood construction driven by four Hispano-Suiza engines of 275 hp. each. The engines are mounted in tandem each side of the main fuselage, there consequently being two tractor and two pusher screws. Normal speed is given as 124 m.p.h.

No direct sales are expected as the result of the exhibition, but the event is made use of to the full in order to create an opinion favorable to aviation. A congress is being held during the exhibition, and this, in addition to being of a technical nature and attended by experts, has a popular side comprising visits to the leading airplane factories, state laboratories, landing grounds, and the shops of aerial navigation companies.

Things Seen at the Paris Airplane Show

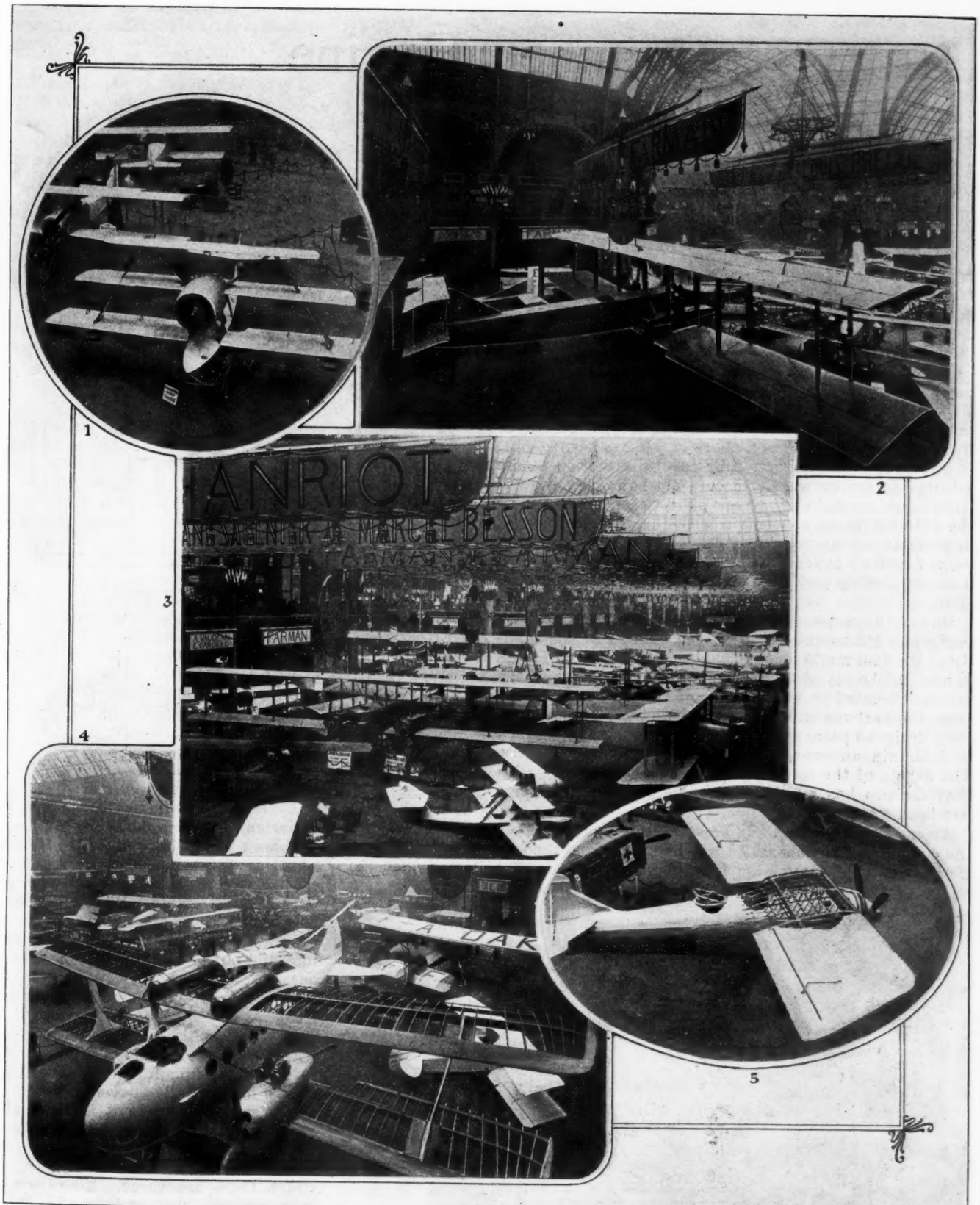


Fig. 1—Berson triplane flying boat. Fig. 2—Farman giant plane. Fig. 3—A general view of the exhibit. Fig. 4—Bleriot 4-engine 20-passenger plane. Fig. 5—Breguet duralumin passenger plane

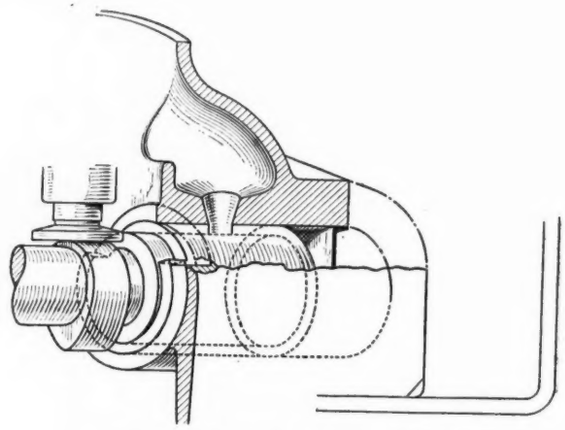
Entirely New Design Embodied in Mitchell Engine

New features include balanced crankshaft, hot spot manifold, unusually light cast iron pistons, pressure feed lubrication of main bearings, an improved combustion chamber form and a thermostatic valve in the cooling system. Quality of fuel marketed said to cause the change in design.

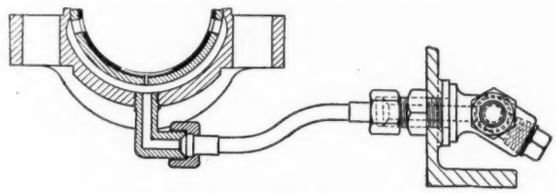
A NEW six-cylinder engine has been designed by the engineering department of the Mitchell Motors Co., Inc., to replace the engine that has formerly been used on Mitchell cars. In developing this engine the designers have aimed particularly at high engine torque at low speed, as well as at economical operation under these conditions, realizing that the average car engine is operated far more at speeds materially below that corresponding to its maximum horse power output than around that speed and above it. It has been sought to minimize internal friction by careful attention to the lubricating system and by accurately balancing the flywheel and crankshaft. Great pains were taken to get the cylinder bores concentric with the cylinder barrels in order to ensure, as nearly as possible, an even thickness of wall all around the cylinders. This tends toward uniform cooling and maintenance of a true cylindrical form.

One of the causes for revisions of engine design with many manufacturers has been the change in the quality of the fuel marketed, and this applies to the Mitchell. A new intake manifold has been produced which has a hot spot located at the top end of the vertical passage from the carbureter. This vaporizes the gas and carefully designed passages and bends with long sweeps tend to maintain an even distribution to all six cylinders. The design of the carburetion system is said to be such that the gas has no chance to condense again once it has been vaporized.

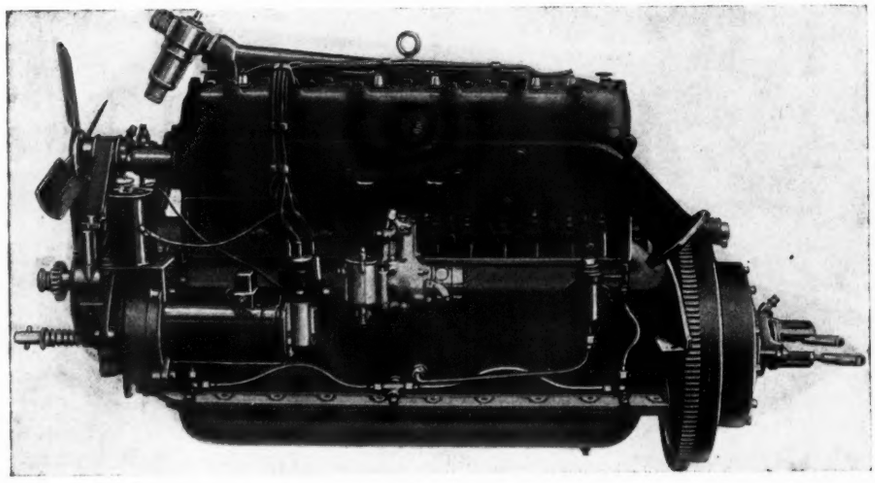
Among other points of interest on this new engine is the combustion chamber. As will be noted from the sectional view, the spark plug has been located in a spot where there is a relatively large volume of gas, and it is evident from the design that turbulence in the combustion chamber has been aimed at. It will also be noted that the combustion space has been designed to extend well beyond the valve heads opposite the cylinder bores, so that when the valves are open there is a passage of less resistance for the gas into and out of the combustion chamber.



Camshaft bearing oil pocket layout



Details of oiling system

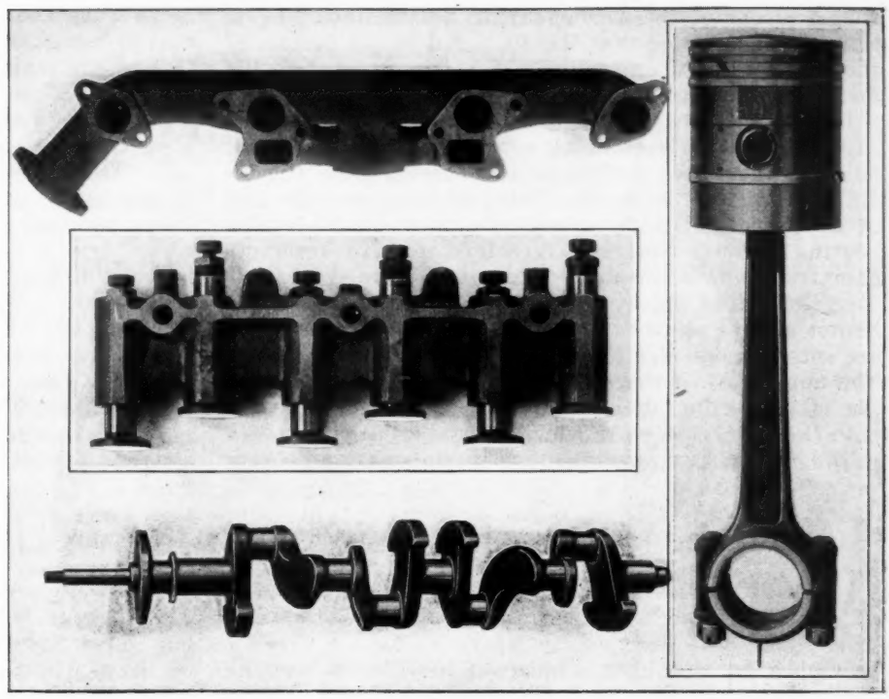


The new Mitchell six cylinder engine

Structurally the engine is of the L-head, block-cast type with six cylinders of 3½-in. bore by 5-in. stroke, with a removable head. The S. A. E. rating is 29.4 hp., but on the block the engine has actually shown over 50 hp. The piston displacement is 288.6 cu. in. The crankshaft is statically and dynamically balanced and has force feed oiling to the main bearings, of which there are three. These bearings are 2¾, 2⅜ and 3½ in. long (front to rear) and all are of 2¼-in. diameter. The connecting rods and camshaft bearings and the gears and

pistons are oiled by a constant level splash system. Cooling water is circulated by pump, and a Fulton thermostat is fitted to lessen the warming-up period and maintain a substantially constant engine temperature.

There are few encumbrances on the right side of the engine, only the starting motor, breather and filler pipe, and the water inlet connection being on that side. On the left side are located the inlet and exhaust manifolds, valves, carbureter, generator and ignition and the oil leads. While there are quite a number of units on this side, they have been so placed that it is still quite easy for a mechanic to adjust the valves. The bottom of the crankcase is of pressed steel, and its removal gives access to all bearings, no special wrenches being required to reach the end main bearings.



Tappet guide block, manifold, crankshaft and piston and connecting rod assembly

Much care has been given to the piston and rod assembly. The piston is of cast iron, but its sections are very light, so much so that it is possible to squeeze it into a slightly oval shape by hand. The thought here is to get a piston which will readily adapt itself to the shape of the cylinder bore. The piston clearance at the top is 0.010 in. and on the skirt, 0.003 in. The bearing surface is nearly equally divided above and below the piston pin. Three compression rings are used, and one oil scraper ring. The piston head, which is ⅛ in. thick, is slightly conical and is finished by polishing. A number of equally spaced ⅛-in. holes are drilled in that portion of the piston between the two bearing surfaces, to relieve the pressure. Flats are cut on the piston immediately above the piston pin bosses, and ⅛-in. holes are drilled at an angle of 25 deg. through which oil scraped into the flats by the ring above is forced into the piston pin bearings.

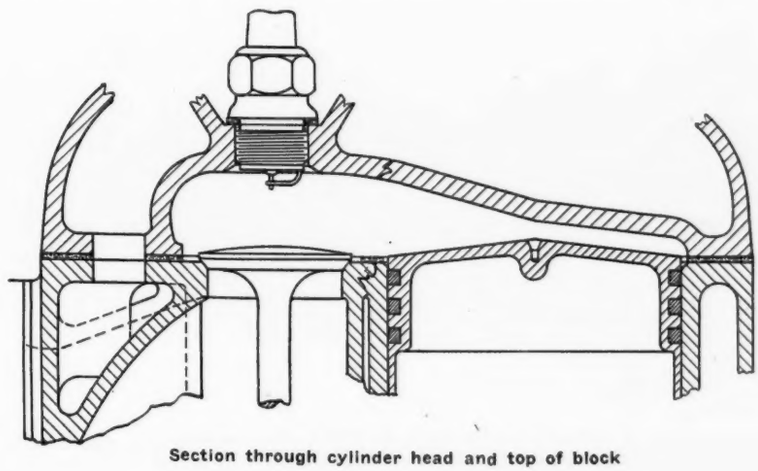
The connecting rods are given a better finish than formerly, and the set of six rods which go into an engine are balanced against each other, both as regards their rotating ends and reciprocating ends. In other words, the rotating or crankpin ends of the rods all weigh within ½ oz. of each other, and the same applies to the piston pin ends of the rods.

There are four rings per piston, 3/16 in. wide each. The piston pins are 63/64 in. in diameter. In order that the piston pin may line up square with the barrel of the piston, the holes in the bosses are reamed in relation to the barrel to within a tolerance of 0.001 in. per in., measured with a plug projecting 1½ in. from the barrel.

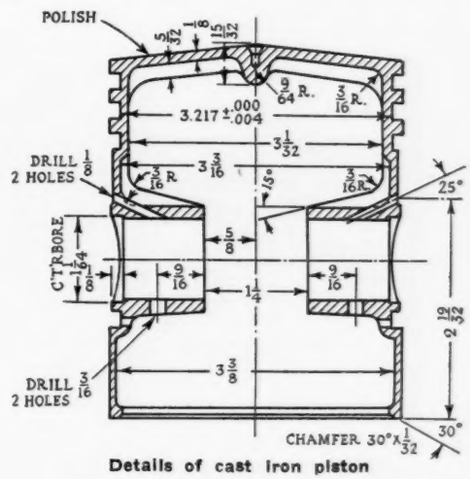
Much has been done to ensure the easiest possible flow for the gases in and out of the combustion chambers. The water spaces around the valves have been materially increased. The valves have a clear diameter of 1⅝ in. and have a lift of 0.275 in. The tappets have been lengthened and are held in removable guide blocks. It is necessary to remove three horizontally placed cap screws from each assembly of six tappets, whereupon the guide block and tappets can be removed as a unit.

A counterbalanced crankshaft is now used. With the shaft supported at both ends and turning at 2000 r.p.m. the middle bearing must not run out more than 0.003 in. The shaft is very stiff and with the pressure system of oiling used a high linear speed on the bearings is permissible.

The lubrication system has been worked out very well, particularly in the matter of oiling the main bearings. A cross sectional view of the center bearing is



Section through cylinder head and top of block



Details of cast iron piston

shown in one of the accompanying illustrations. From this it will be noted that the oil is fed to the bottom of the bearings by a cross line which is connected to the main distributing line outside the engine by means of a T. The oil is carried behind the bearing metal in the cap and reaches the bearing surface through two small holes in the upper portion of the bearing near the dividing line. The holes are located on opposite sides and in a channel extending almost the entire width of the bearing. These channels, therefore, form a reservoir dam from which the oil is fed to the revolving shaft over the entire width of the bearing, which is said to be not always so when the oil channels in the bearings are cut from one side to another and cross in the center. The upper half of the main bearings is oiled by splash, the oil collecting in suitable pockets formed integral with the crankcase webs which carry the bearings.

The camshaft is also oiled by splash, suitable pockets being cast above the bearings and so arranged with curved baffles which help throw the oil into the pockets. One of the features of the oiling system is the manner of attaching the outside oil leads and the drain arrangement. The connections between bearings are made by copper tubing, each section being made with a rise and fall. This allows for any variation in length and makes it possible to drain any of the leads without affecting the others. At each T there is a plug, the removal of which drains that particular lead. These form catch pockets in which settle foreign substances which may get into the oil, and once they have been trapped there is no danger of them being again set into circulation.

A change has been made in the timing gears. A steel camshaft gear is now used, in connection with fiber crankshaft and generator drive gears. The camshaft gear is very much lighter than the combination steel and fiber gear formerly used. This gives a quieter drive.

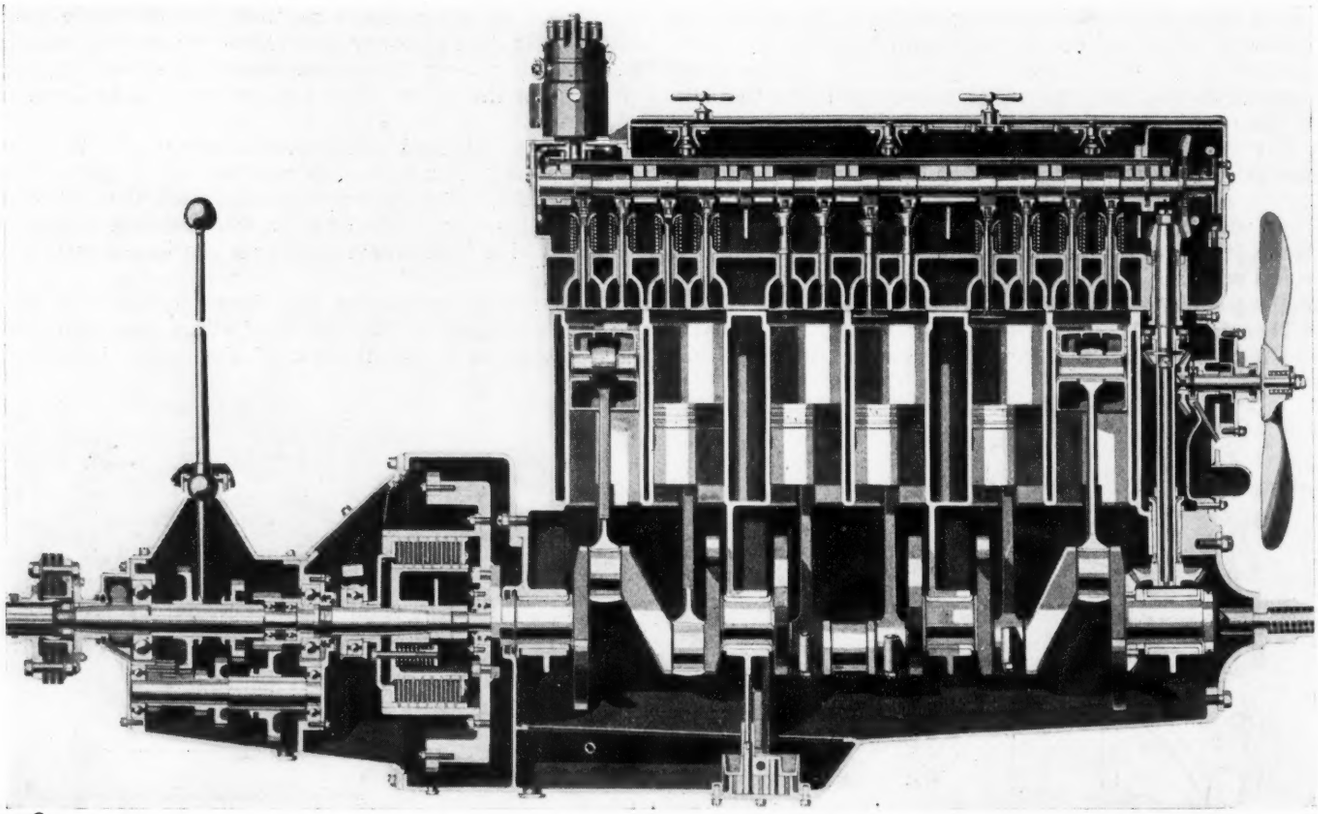
Overhead Camshaft Engine on New Leach Power Plus Six

A SECTIONAL view in halftone is shown herewith of the six-cylinder engine of the Leach Power Plus car. This engine was designed by Harry A. Miller, who for years has been building special engines for automobile racers. It will be noticed that the design here shown embodies many features current in racing engine practice. The engine has cylinders of 3¾ in. bore and 5¼ in. stroke, and while the S. A. E. rating is only 33 hp., brake tests are said to have shown the engine capable of delivering 107 hp. The crankshaft is provided with balance weights.

The valves are located in the cylinder head and are operated by an overhead camshaft. The latter is driven by means of spiral bevel gears, as are the fan and water pump. An aluminum cover incloses the valve mechanism and side plates cover large hand holes in the sides of the cylinder block, making all parts of the engine unusually accessible. There are no accessories or parts on the left side of the engine, which side is absolutely free, while on the right-hand side there are only the carburetor and manifold. The pistons can be removed from the engine either from above or below.

Large water spaces are provided on the cylinders, which extend down their entire length. Engine lubrication is by pressure feed. High economy is claimed for the engine, the car mileage being given as 14.5 on a gallon of gasoline and 2000 on a gallon of oil.

Changes have also been made in the chassis and body of the Leach six for 1922. The wheelbase has been lengthened to 134 in., new heavier springs have been fitted and shock absorbers eliminated.

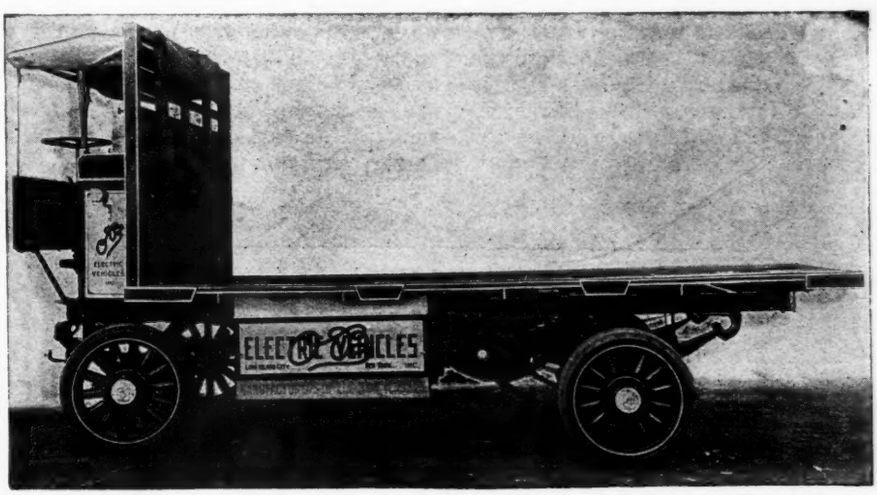


Sectional view of new Leach motor, Model 9-99, showing overhead valves and camshaft, and counterbalanced crankshaft, as well as oiling system

A New Make of Electric Truck

Series type resistance is used to facilitate gradual starting and acceleration. Motor drives through a silent chain, running in oil, to a jackshaft with differential, and thence to rear wheels by roller chains. Made in four sizes.

A NEW method of control which permits of very gradual starting and of speed variation by imperceptible steps has been brought out by O. B. Electric Vehicles, Inc. The firm will manufacture a complete line of trucks. All of the four models (1, 2, 3½ and 5 tons) are designed along the same lines. These trucks are equipped with a single G. E. motor which drives through a silent chain running in oil to a countershaft or differential shaft, from the ends of which the power is transmitted to the rear wheels by roller chains in the usual manner. The frame is made of rolled steel channels with the open side outward, which permits of securing brackets and other fittings to the inside with comparative ease. The spring hangers, which are riveted in place, are developed in the form of frame corner pieces. The two side rails have their ends bent at right angles so as to form one-half of each end cross-member, and they are joined together by fish-plates, inside and out, and rivets. The main frame members thus are identical in form and therefore interchangeable. This principle of making parts on the right- and left-hand sides of the truck alike and interchangeable has been followed throughout the design, and materially simplifies the service problem.



One of the new O. B. electric trucks

The battery is underslung between the front and rear axles. The battery box is made of angle steel riveted to the frame. There are guides on the floor for the battery trays, three trays being slid into the box from each side. After all of the trays are in place a crossbar is bolted in position in front of the trays, holding them securely in position. The battery box is covered by a sheet of compressed pulp which keeps out dust and water. Forty-four cell batteries are used on all models, which has been found most convenient for charging from 110-volt circuits. On the 3½-ton model the battery has a capacity of 300 ampere-hours.

The most interesting feature of the O. B. truck is the controller. It is of the resistance type, introducing resistance into the main circuit, which is gradually cut out. It will be understood that the single motor is of the series type, and its speed under any given load can be varied by changing the voltage impressed upon its terminals. This can be conveniently done by including a variable resistance in the motor circuit. It is true that a certain amount of energy is lost in the resistance, but the idea is to use the resistance only in starting, while maneuvering and when caught in a traffic jam, and the total amount of time that any appreciable power is lost in the regulating resistance is comparatively small. On the other hand, the use of an almost infinitely variable resistance has the advantage that it permits of jarless starting from rest and of exactly suiting the speed to traffic conditions. The resistance used is the Allen Bradley type of current compensator, which consists of a stack of resistance material the resistance of which can be varied within wide limits by subjecting it to mechanical pressure. This compensator is combined with the O. B. controller. As the circuit is first closed, the current is compelled to flow through the compensator with very little pressure on the resistance material, hence it encounters a great deal of resistance, little current flows into the motor and the latter exerts but a very moderate torque. As the controller handle is moved over further the resistance material is compressed, its resistance is reduced and the current flow and motor torque increase. This continues until the resistance material is fully compressed and the resistance is at a minimum. There is only one more step on the controller, and that is with all the resistance cut out of the circuit. The controller is located under the driver's seat, and the handle extends up from the seat at the side of the driver.

The wiring from the battery to the motor and controller is carried in conduit in the frame channel on the outside. The wires are laid in grooves cut in two boards, which are placed with the grooved sides together. These boards are placed into the frame channel and the whole is then protected with a sheet metal cover.

Steering is through a spur pinion and sector reduction gear, with a large handwheel whose rim is wound with cord. The service brakes are of the internal expanding type and are of very large diameter. There is a pair of emergency brakes on the ends of the countershaft. Both brakes are equalized, and the operating devices of both are provided with ratchets by which they can be set in place.

As is customary in electric vehicles, anti-friction bearings are used throughout. The motor itself has ball bearings, and adjustable roller bearings are used in the front and rear wheels. For adjustment of the chain tension, radius rods are provided between the rear axle and the differential shaft housing. The turnbuckles on these radius rods are provided with square portions at the middle of their lengths to take a monkey wrench. This same plan of providing square wrench seats is followed out in the hub caps. Another feature bearing on the servicing problem is that the squared portions of the hub caps of all models are of the same size, so the same size of non-adjustable wrench will fit them all.

The wheels are of the Archibald wood type with two-piece felloe. The springs are of the Spring Perch Co.'s make.

All three lamps carried on the truck are of the same design, except that the rear lamp has one red glass. The trucks are sold with an equipment comprising the seat, lazy-back, footboard and cushion.

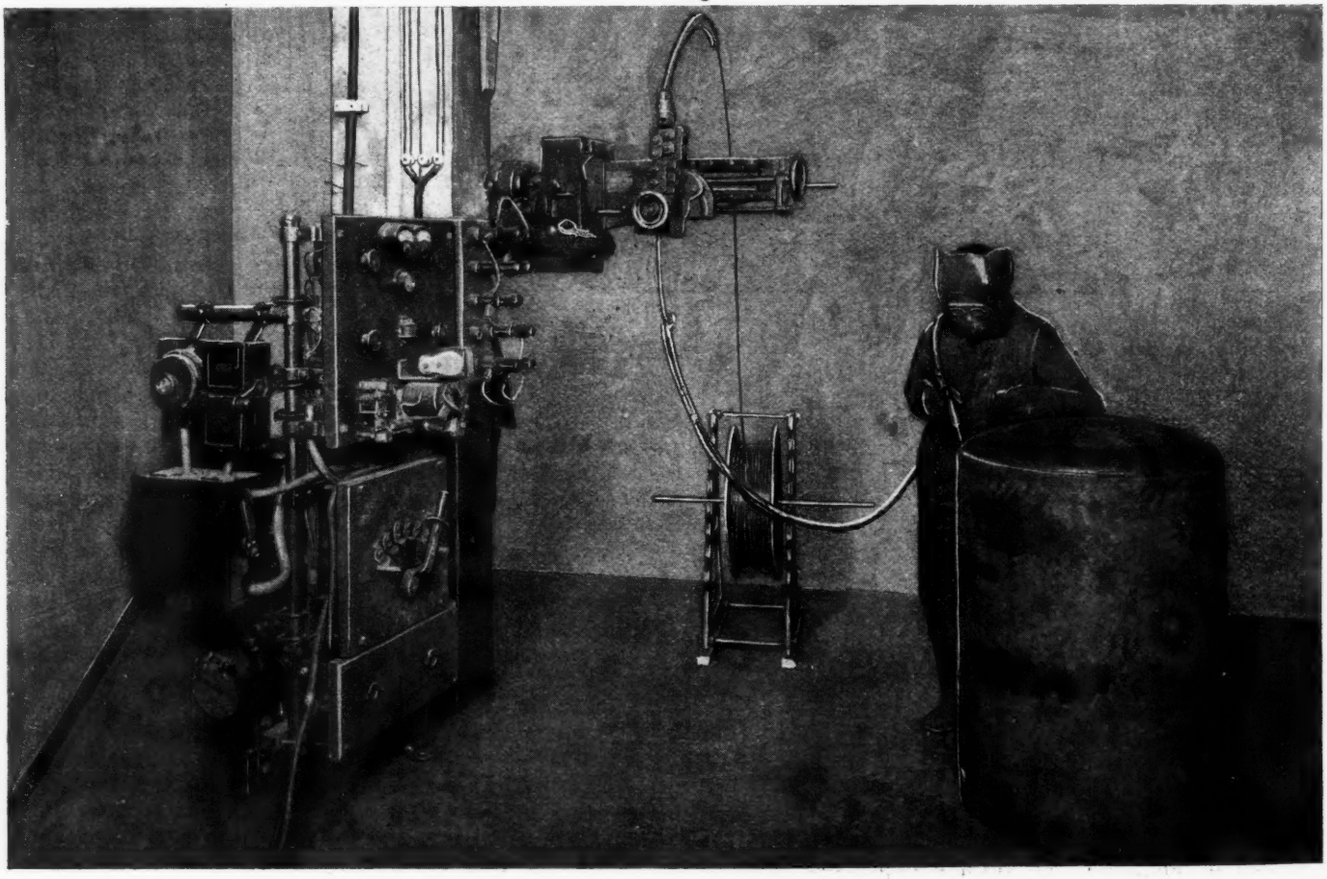
Semi-Automatic Arc Welding

A SEMI-AUTOMATIC arc welding lead has just been developed by the General Electric Co. for use in conjunction with its automatic arc welding head, which retains the continuous features of the automatic apparatus, yet allows the operator to direct the arc as required by the conditions of the work.

The apparatus consists of a welding tool to be held by the operator, which acts as a guide for the electrode wire. In the handle of the tool, which greatly resembles an automatic pistol, is a switch for operating the control on the panel of the automatic welder to start and stop the movement of the electrode wire. Attached to the tool is a 10-ft. length of flexible steel tubing, called the "flexible wire guide," with an adapter on the other end for attaching it to the automatic welding head. The wire passes from the feed rolls of the head into the flexible tubing, and thence to the arc through a "guide nozzle" in the welding tool. The automatic welder functions in its accustomed manner, tending to hold the arc length constant, and the operator merely directs the arc as required by the exigencies of the particular job.

The field of application of the semi-automatic is the welding of products where the seams to be welded are of very irregular contour, or on very large work where the travel mechanism and clamping necessary for the full automatic welder would be complicated and costly. In many cases the edges of the seams are not accurately prepared, making gaps in some places and tight fits in others. The automatic welder with mechanical travel cannot compensate for these conditions by varying the speed, or by manipulation of the electrode, but with the semi-automatic they are taken care of.

The semi-automatic welder may also be used for building up metal rapidly, as in the case of the filling up of blow holes in castings, or the building up of worn spots, etc. The speed of deposition of the metal varies widely, being somewhere between the ordinary hand speed, and that of the automatic, according to the conditions of the particular job. In general it is about twice as fast as hand welding.



Semi-automatic electric arc welding outfit developed by General Electric Co., Schenectady, N. Y.

Weather Protection on British Open Cars

Sudden development in framed side panels for folding tops evident at the Olympia show. Standardized rear cowl on Humber. Combined side panel and rear screen on Swift. More than a dozen makers adopt the scheme, either offering the panels as standard equipment or at an extra cost.

By M. W. Bourdon

AN outstanding feature of the open body designs exhibited at Olympia was the large number fitted with means better than the ordinary detachable side curtains for affording weather protection to passengers.

At the shows of 1919 and 1920 standard cars were alone in providing framed side panels with transparent centers for the folding tops, but at this year's show there were more than a dozen British makes using some variation of the Standard scheme. This sudden consideration for passengers' interest is due, without question, to the popularity and practical success of the originator's arrangement, and without suggesting for a moment that Standard cars have not many other points of appeal, it can safely be said that the almost completely justified claim that they combine the protection of a sedan with the advantages of an open car has been a sales argument of no little weight.

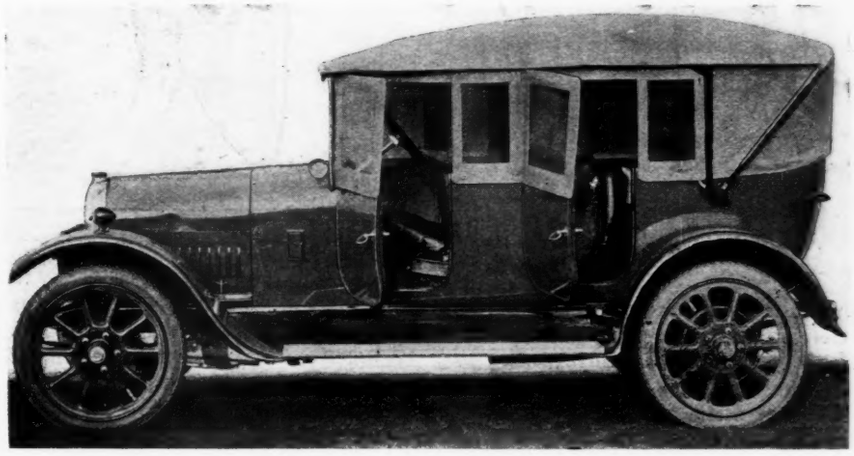


Fig. 1—New 11-hp. Humber with standard four-passenger body and folding top with framed side curtains that open with doors

The accompanying sketches illustrate eight different arrangements. In some cases this "all-weather" feature is standard equipment furnished with all open bodies; in others rigid framed panels are an extra, as with Wolseley and Enfield-Allday. As will be gathered from a discussion of individual designs, most of the front panels can be used as side wind deflectors when the top is folded; on the Swift four-passenger the units —each consisting of three panels and extending to the back of the rear door—can be utilized at the sides for this purpose, or as a rear shield; but others depend upon the top for partial support and cannot be used with the latter down.

In all cases some provision is made for storing the side panels when they are not in use. Usually there is a tray under the front seat. Not all methods are effective in preventing head draughts entering between the valance of the top and the upper edge of the side panels; further, not all open with the doors automatically, a few needing some form of clip or turn-button to be released as a preliminary.

Humber. To apply this scheme to the best advantage, inside and outside door handles are required, and these are found in a few examples—Humber and Standard, for instance. The Humber application, Fig. 1, is on lines similar to the Wolseley, so far as the means of anchoring the rear corner of each over-door panel is concerned. A flat steel tongue drops into a neatly fitted socket in the door frame, though the Humber "tongue" is not so conspicuous as that of the Wolseley. Humber provides four transparent panels on each side of the four-passenger cars, arranged as three separate units; over the front door, alongside the front seat and over the rear door, and behind the rear door.

The front unit has a flap extension of the fabric which incloses the flat metal framing of the transparent panel, and this flap is secured top and bottom to the fixed vertical pillar of the shield, the fabric thus forming a flexible "hinge" which eliminates the need for precise alignment of door and curtain hinges. The front panel of the central unit is secured by turn-buttons to an inner valance of the fabric top and to the body side in the same manner, and forms the support of the fabric "hinge" for the panel over the rear door. The third unit is also secured by turn-buttons at top, bottom and rear edge.

The inner valance running the whole length helps prevent draughts passing in over the tops of the panels, and to the same end the free top corners of the over-door panels normally spring inward from the vertical so as to press firmly against the frames of the units against which they abut when closed. For storing the panels a locker is provided under the front seat.

This provision is found as standard on all Humber open cars. The 16-hp. five-seater has in addition a rear cowl hinged to the back of the driving seat and sup-

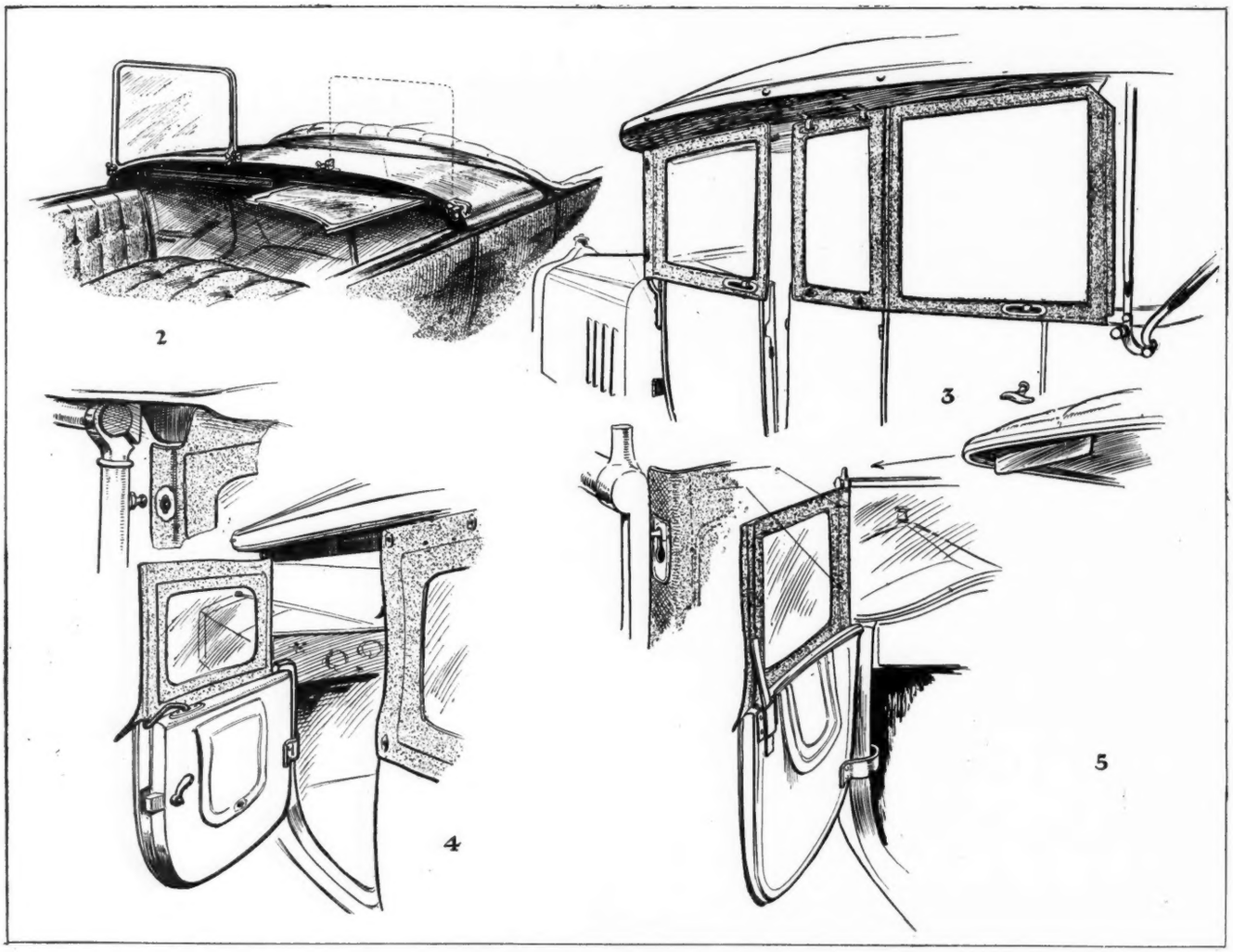


Fig. 2—Humber rear cowl and shield, one of the latter half-entered in its storage pocket. Fig. 3—11 hp. Standard. Fig. 4—Albert. Fig. 5—Wolseley

porting on its rear edge a pair of detachable windshields. The transparent portion is thick non-inflammable celluloid, and each shield can be removed by unscrewing two thumb nuts and stored in one of a pair of horizontal pockets formed in the cowl with slot openings at the rear. To assist in raising the cowl a hinged telescopic tube with a stiff helical spring inside is fitted at the center just below the hinge.

This cowl and windshield fitting can be used with or without the side curtains and whether the top be opened out or folded. It is also removable entirely by drawing out the hinge pin, leaving only a neat half-hinge on the top of the front seat panel. When raised with the front seats occupied the windshields are horizontal and well over the heads of the occupants, and the cowl cannot fall forward because of the stop provided by the telescoped tubes.

As the accompanying sketch (Fig. 2) shows there is a space between the two shields. This permits a certain amount of draught, but not so much as might be imagined, as, owing to the front windshield the air currents are not direct. The reason for this separation of the shields is to allow them to be stowed away in the pockets provided in the cowl, the curvature of the latter preventing a single and full width shield being accommodated in this way. At present Humber is the only British maker with a standardized body supplying anything of this kind.

Standard. The sketch showing the Standard side curtains (Fig. 3) is almost self-explanatory; it need only be said that the darkly shaded portion is a detachable valance or strip of thin leatherette—the material used for the top itself—this strip being secured to the framing of the top by snap buttons and pierced to take the short leather straps which support the top edge of the central panel. The strip is also a draught excluder.

Albert. The Albert front panels are also secured to the windshield standard by snap fasteners on extension flaps of the fabric which surrounds the celluloid panels. But the fabric does not inclose a full metal frame as in most other cases, there being merely two round section uprights to keep the panel as a whole taut vertically. The peculiar shape of the bottom extension of the rear upright is evident in the sketch (Fig. 4); it is formed thus to enable it to swivel outward in the socket on the door to avoid dragging and straining the panel when the door is opened and to allow the inside door handle to be operated from outside the car. Within the door panelling is a spring which normally tends to keep the panel tight against the door and adjacent curtain. In this case, also, an inner valance is fitted and has the center panel (alongside the driving seat) attached to it by turn-buttons; but it is not, as in the Humber, stitched to the fabric of the folding top—merely to the top bows at three points—so that draught exclusion is by no means complete. As in the Humber there are three units, the central one of two panels and the rearmost alongside the back seat.

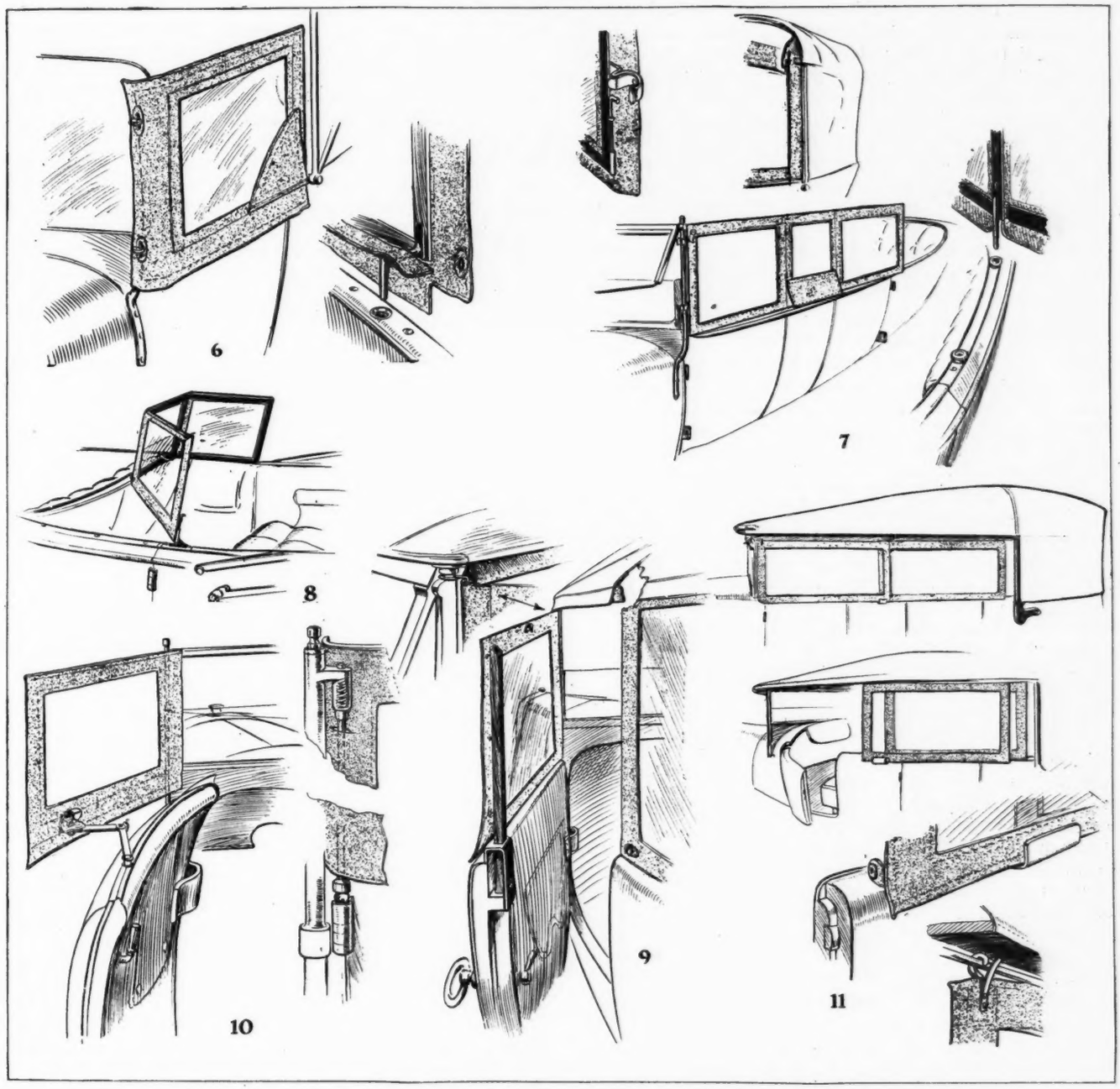


Fig. 6—10 hp. Swift. Fig. 7—12 hp. Swift. Fig. 8—12 hp. Swift, side curtains used as rear screen. Fig. 9—Riley
Fig. 10—Sunbeam. Fig. 11—Enfield Allday

Wolseley. As with the majority of these open-with-door side panels, the Wolseley arrangement has evidently been adapted to an existing folding top. To exclude draught where the top framing overhangs the screen pillars, a wood filler piece has been attached to the corner of the front bow and from it hangs a short valance; this somewhat makeshift feature is indicated in the right-hand inset sketch of Fig. 5 herewith. The left-hand inset shows the slotted plate by which the hinge flap of the front panel is secured to a stud on the windshield post. In this case, as in the Albert, the metal framing within the fabric surround of the celluloid is not complete, consisting merely of a flat steel upright at the rear end dropping into a socket on the door.

10-hp. Swift. The fabric in this arrangement (Fig. 6) is supported by a full frame of flat steel, the latter being exposed on the inside and having cranked steel "pegs" of round section riveted to it. These pegs, one back and one front, drop into holes in the door tops, while the "hinge" is again of fabric attached to the windshield pillar. The rear lower corner has a triangular fabric flap, serving two purposes, (1) to allow one of the occupants to extend an arm for signalling to other drivers, and (2) to enable the inside door handle to be operated from the outside. No special provision is made for excluding draught over the top of the panel.

12 hp. Swift. As already mentioned, one of the "curtains" of this car can also be made to serve as a three-panel rear seat shield and is shown in use as such in Fig. 8. But it should first be said that the complete side panels—three in all—form a single unit on each side, the front and back sections being hinged by the fabric to the central one. At the front the unit is secured to the tubular pillar of the windshield by spring clips, as shown in the left inset view of Fig. 7. A secondary interior valance of the fabric top serves to exclude draught and to support the upper edge of the central panel, a sectional view being given in the upper inset of Fig. 7,

taken at the back of the side opening. A signalling flap at the bottom of the central panel is normally held closed by a metal tongue projecting inwardly over the bottom framing. The latter is exposed to the interior and has the fabric surrounds of the celluloid riveted to it. Two pegs drop into sockets below the central panel, as indicated in the right-hand inset, the holes in the tops of the body sides having rubber sleeves let into them to prevent rattle. The rear corner of the back panel is held closed by a "bolt" of 3/16-in. wire bent to a right angle at the top.

One objection to this arrangement, as it is applied, arises from the doors and panels hinging at opposite ends in respect of both front and rear entrances. Thus the panels do not open with the doors but must be manipulated independently. Further, the U-shaped spring clips at the front edge are not ideal and will either break or the unfastening of them will cause the fabric to be strained and torn, though a leather tab is attached to the top corner to serve as a hold.

A side unit serving as a rear shield is seen in Fig. 8. There are two rubber lined holes in the back of the front seat for the pair of pegs on the central panel, and at each lower corner of the side panels is a "bolt" to locate the ends by dropping into a slotted socket on the body sides. Used as a windshield, the fitting is by no means rigid, but it is almost as firm as the majority of the extending arm rear shields pure and simple. It should be quite as effective as a means of protection when the triangular corner pieces of fabric which are provided are fitted to fill the spaces in front of the side panels and inside the doors.

Riley. This application occurs on a two-door, four-passenger body (one wide door in front at each side and tip-up front seats). The fabric surrounds inclose a flat section steel framing which at its top front corner has a horizontal wire ring extension at right angles to form a hinge when it is dropped over the stud at the top of the windshield pillar, this stud serving primarily as an anchorage for the folding top (see inset in Fig. 9). At the rear the panel framing is secured by snap-buttons to a steel tube of square section which drops into a somewhat unsightly socket on the door. A second shallow valance is stitched to the fabric top as indicated in the sectional portion of the sketch, but finger manipulation is needed after the door and panel have been closed to push the outer valance outside the top edge of the surround. The rear panels are fixed by turn-buttons at bottom and rear, but at the top, as in the case of the front panel, flat spring steel hooks are used to hold the inner valance to the surround.

Sunbeam. This embodies a distinct improvement on most of the other arrangements in regard to the hinging of the panels over the doors. Attached to the top of the windshield pillar in vertical alignment with the exterior hinges of the doors is a rearward elbow with an extension at right angles projecting down. This extension is cylindrical and contains a spring-backed plunger with a spherical bottom end. The fabric surround of the celluloid has a flat steel framing at top, bottom and rear, but at the front the flat steel is secured to a round section vertical rod, inclosed in the fabric excepting its projecting ends; the latter are cupped, the top one engaging with the spring backed plunger which presses the lower one on to the top of the pin of the door hinge. This system, which affords a neat, workmanlike and draught-proof fitting, is illustrated at the right of Fig. 10. On the left of the sketch are seen the hinged arms by which the back corner of the panel is held to the door, and the finger hook for drawing the panel inward. These hinged arms are needed to enable the door to be opened from the outside of the car, for interior handles only are provided; also they allow the "window" to be pushed open for ventilation.

Enfield-Allday. The scheme adopted by Enfield-Allday (Fig. 11) differs fundamentally from all others, for no attempt is made to arrange hinged panels or to make the latter open with the doors. There are two panels at each side of the car (a four-passenger, four-door body), and by means of four steel hooks—two for each—they are hung from horizontal rods attached to wood filling-in strips under the valance of the folding top. A guide plate fitted to the body side between the doors, prevents flapping at the center when all is closed up. The two central hooks on the panel frames are inverted in their position on the rod; that is to say, the back hook of the front panel is fitted behind the front hook of the back panel, this arrangement allowing either unit to be moved forward or backward without disturbing the other. So, as shown at the center of Fig. 11, the panels are slid rearward to open the front door; and vice versa.

The wood filling-in strip under the valance at the front end of the top is a fixture with its section of "curtain rod" and folds back with the top. But the rear one is detachable and must be removed before the folding process commences; it is secured by a couple of pegs at one end and a turn-button at the other end. A feature of the folding top unconnected with the side panels is a concealed spring within each rear support, the latter of square section steel; by this means the top unfolds itself and carries the front bow to the windshield, after it has been given an initial lift and light forward push.

Loading and Unloading Devices

IMPROVEMENT in road transport can be brought about by educating the motor car user to an appreciation of the importance of doing away with delays in loading and unloading at terminal points. This fact is strongly emphasized in the London Times, which declares that these delays and failure to overcome them have offered definite sales resistances in several instances. Blame cannot be wholly placed on either the manufacturer or the user, although a good share of it can be laid at the door of the latter, since failure of proper organization is largely responsible. The manufacturer, on the other hand, has perhaps not given thought enough to this feature in the design of motor trucks.

Loading equipment, however, does not come within the scope of the automobile manufacturer, but a bit of propaganda emanating from the automobile factory, emphasizing the need for organization and proper facilities might have the tendency to overcome this sales resistance. The manufacturer, of course, has been discouraged from equipping trucks with such devices because he has heard from far and wide the demand to "cut costs." Cost cutting cannot well be accomplished with the addition of equipment.

Motor truck salesmen, however, could probably extend their replacement market, as well as develop new fields, were they to educate the motor truck users in methods and means of reducing the time required at loading and unloading stations.

Gear Tooth Shape and Its Relation to Standardization

The properties of the involute form of gear tooth are discussed. True involute teeth with a certain pressure angle and relation between addendum and diametral pitch will not interfere with pinions down to 12 teeth. Such a system would facilitate universal interchangeability.

By E. W. Miller*

FOR standardization none probably will contend for a tooth design other than involute. Those who have studied gear teeth for many years appreciate that the number of possible gear tooth curves is almost infinite. The vast majority concede the decided superiority of the involute to any other as yet discovered. It is, therefore, suggested that the involute system only be considered.

Let us think about an interchangeable system. Let this system consist of all members from 12 teeth to a rack, inclusive. It is understood that each member of the system will run satisfactorily with any other member. The advantages of this plan are obvious. The gear manufacturer may make up a quantity of gears with various numbers of teeth and carry them in stock. This not only permits of quantity production with its lowered costs, but assures quick delivery, which is many times a vital factor. Further, the matter of blank size and depth of cut is simple, and a matter of importance when, as often is the case, the best of help is not procurable. If an interchangeable system results in less spoiled work, this factor should be considered in weighing the matter. With the obvious advantages of a standard for gear teeth and an interchangeable system, it seems conclusive that a standard interchangeable system is desirable. This would insure interchangeability of the different gear members made up in various plants. Further, the customer could easily specify his requirements and know whether his order brought him the proper gear or not.

The involute curve stands pre-eminent in the field of gearing. With teeth shaped to involute outlines, gears are to-day performing feats which a few years ago with other shapes seemed impossible. The involute is not alone responsible for this advance, but it has been a great factor, due to the comparative ease of its duplication and ability to operate properly at various, and sometimes varying, center distances. We, therefore, turn with interest to the study of this curve.

Theory of the Involute

The involute is that curve traced by a point on a cord as the latter is unwound from a cylinder. This cylinder is known as the base circle. Fig. 1 makes this plain. The pencil point fastened to the cord traces the involute curve as the cord is unwound from the base circle. In Fig. 2 a card is attached to a base circle of the same size and a cord carried by the same is passed over an idler pulley. If the cord is pulled in the direction of the arrow, with a frictional resistance applied to the base cylinder, thus keeping the cord taut, the base circle with the card will rotate in the direction of the arrow, and a tracing point in the cord will draw a curve on the card. Obviously, the curve developed is identical to that traced in Fig. 1, since each curve has been traced by points on a cord unwound from base circles of identical diameter.

Involute Traced on Recording Card

Fig. 3 shows a pair of disks, the upper being two-thirds the diameter of the lower. If the cord with the tracing point be wrapped about the two disks and the lower provided with the recording card, an involute will be drawn upon that card as the upper disk is rotated, winding up the cord and unwinding from the lower member. In similar fashion an involute is traced on a recording card mounted upon the smaller disk, as shown in Fig. 4. If the cards are cut carefully on the involute line and mounted as in Fig. 5, it is plain that as the cord is wound upon the one disk and unwound from the other, the two cards will be in continuous contact at the tracing point, since the curves are simultaneously traced by that point. If the travel of the cord is uniform—that is, moving constantly an exact distance in an exact period of time—it follows that the contacting of the involutes takes place uniformly along the path taken by the tracing point. If the cord is removed and one disk member is rotated uniformly, the other disk will also uniformly rotate, since its rotation is brought about by contact of involutes developed by the same tracing point. The straight portion of the cord is called the line of action, because contact of the involute surfaces takes place along this line.

In Fig. 6 are shown two base circles of 3- and 6-in. diameter. A cord wound about the two and tightly drawn is assumed to have developed the two involutes shown through the medium of a tracing point therein. It is apparent that two complete revolutions of the 3-in. circle will wind up an amount of cord equal to the circumference of the 6-in. circle, and will thereby cause one complete revolution of the latter. It is also known from previous demonstration that involutes I and F will be in continuous contact along the line of action, the contact beginning at P and ending at S. If several involutes, as I and F, are properly spaced about their base circles, and the base circle of 6-in. diameter is rotated continuously, it follows that the set of involutes carried on the larger, engaging those on the smaller, will at each revolution cause two revolutions of the smaller. The

*Condensed from a paper recently presented before the American Gear Manufacturers' Association. The author is chief engineer of the Fellows Gear Shaper Co.

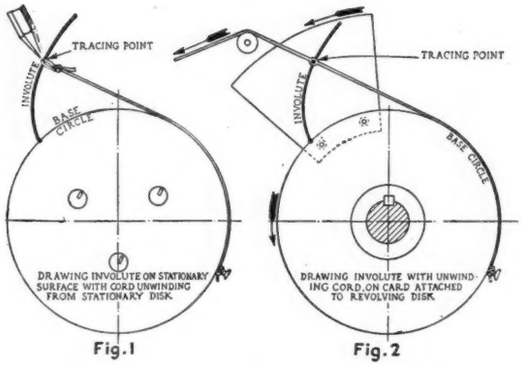


Fig.1

Fig.2

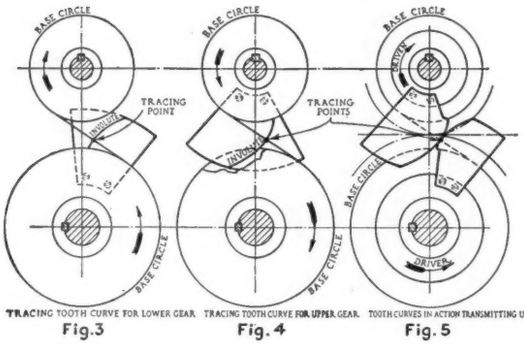


Fig.3 Fig.4 Fig.5

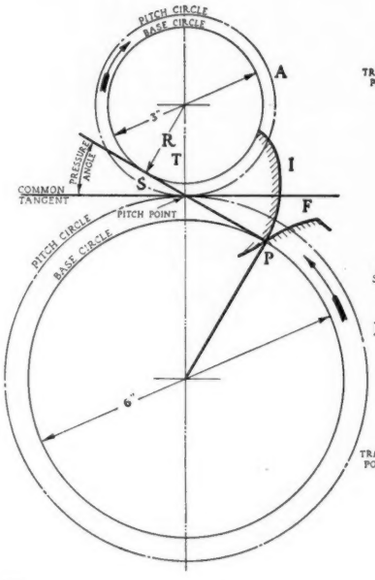


Fig.6

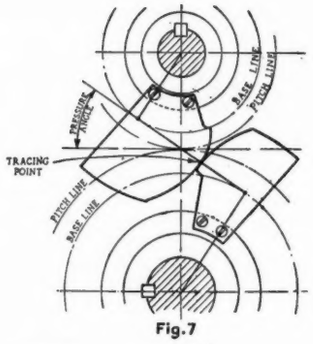


Fig.7

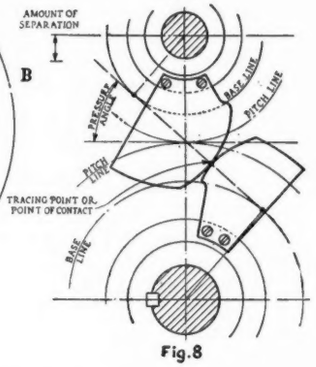


Fig.8

two base circles cannot be brought into contact, for in that case the tracing point on the cord wound about the two will follow around these cylinders, defining the same. The two would appear as rolls in contact, the one being driven by the other only through friction. If an appreciable load is to be carried, projections must be provided to assure positive contact. In order that these projections may be utilized the base circles must be separated. If from the base circle centers other circles having the same diameter ratio as the base circles are drawn tangent to each other, we may consider them as a pair of properly proportioned disks upon which may be located involute projections developed from the base circle, thus effecting a positive drive. These circles are called the pitch lines. Their point of tangency is called the pitch point. The pitch point is also defined as the point at which the line of action crosses a straight line drawn through the base circle centers. The common tangent is a line at right angles to the line of centers and passing through the pitch point. The pressure angle is the angle which the line of action makes with the common tangent.

In Fig. 7 is shown a pair of base circles with templets and involute shape obtained as in Fig. 5. The cord wound about the two disks represents the line of action. If the two centers are further separated, as in Fig. 8, and both disks are free to rotate upon their centers, the cord will inevitably keep the profiles in contact, since the involutes cannot possibly escape from the tracing points which define them. It is apparent, too, that the line of action makes an increased angle with the common tangent, denoting increased pressure angle. The pitch point also appears in a new position.

Fig. 9 shows two base circles, A and B, of identical diameter. Involutes I and F have been developed from these base circles by methods previously described. It is assumed that the two involutes are securely fastened to the base circle. If involutes I and F are mounted on the back face of the disks, they may act as means of rotation, permitting the installation of a recording card and tracing cord with tracing point as shown. As F is rotated in the direction of the arrow, thus driving I, contact of the two involutes takes place along the line of action. The recording card is of rectangular shape, running on guide pins, and free to move endwise. In Fig. 10 is shown an end view of the recording card, having a fin of infinitesimal thickness. This fin is tightly pressed by the pitch cylinders at K, and it is assumed that their rotation causes endwise movement of the recording card at exactly the peripheral speed of the disks and at right angles to the line of centers. If the tracing point is pulled along a distance E, any point in the base circle obviously moves the same distance; but a point in the pitch circle moves a greater distance by an amount in direct proportion to the ratio of the radius of the pitch circle to that of the base circle. Therefore, when the tracing point moves a distance E, a point on the recording card moves a distance S. Evidently then

$$S = \frac{R}{T} \times E.$$

It should be plain that line M is traced on the recording card as the tracing point travels the distance E, and the starting point on the card moves distance S. M is the resultant of both forces acting in a straight line. Therefore, M also is a straight line.

In Simultaneous Contact

The involutes I and F and the straight line M have all been traced by a point in a cord being wound upon A and unwound from B, and the three are in simultaneous contact in any position along this line. Note the contact at C. It can be mathematically determined that line M stands perpendicular to the line of action. It will be noted from observation of the straight line JJ that this line has been drawn at an angle other than 90 deg. with the line of action and tangent to involute F. It does not pass through the point of contact of involutes I and F, and, therefore, does not meet the conditions for satisfactory operation with the involute curve. From all this it is evident that a member traveling in a straight line tangent to a circle struck from a base circle center must be provided with a straight edge or tooth to properly engage a surface of involute outline. This straight tooth member is known as the involute rack.

In Fig. 11 is a base circle X, and tangent to the same is drawn a straight line P representing the line of action. Straight lines perpendicular to line P will evidently function properly as involute rack teeth, since they fulfill the conditions already set forth of being straight and at right angles to the line of action. The line OO is drawn through the intersection point of one of the straight lines and the line of action. The center of circle X′ is the same distance from this intersection point as is the center of circle X. Circles X and X′ have the same diameter. The line of action becomes also tangent to X′. Here is a condition like that in Fig. 9, and it is evident that the pitch point P is determined by the distance in a straight line from the center of the base circle to the intersection of line B with line of action. This is represented by line N. The common tangent of the gear pitch circles becomes the pitch line of the rack. The pressure angle, being the angle which the line of action makes with the common tangent, is determined by the direction in which the straight line acting as a rack tooth moves. Obviously, the length of the gear pitch radius (as line N) determines the common tangent, thereby establishing the direction of travel and pressure angle. It is interesting to note the effects of the lengths M, N, J and K. They result in the various rack pitch lines indicated, and the pressure angles 60 deg., 45 deg., 30 deg. and 15 deg. If the radius Z were used as a pitch radius, the straight line representing the rack tooth becomes a point. Its direction of travel is that of the line of action, and its pressure angle is zero. The gear pitch radius must intersect the line of action. Base circles must have radii of some length, as, for example, Z. It is, therefore, apparent that, however great we may imagine the pitch radius to be, it must still make an angle (admittedly slight) with the line of action. We conclude from this that the greatest theoretical pressure angle is almost 90 deg., but never quite so.

It has been demonstrated that a change in base circle center distance affects the pressure angle of two involute

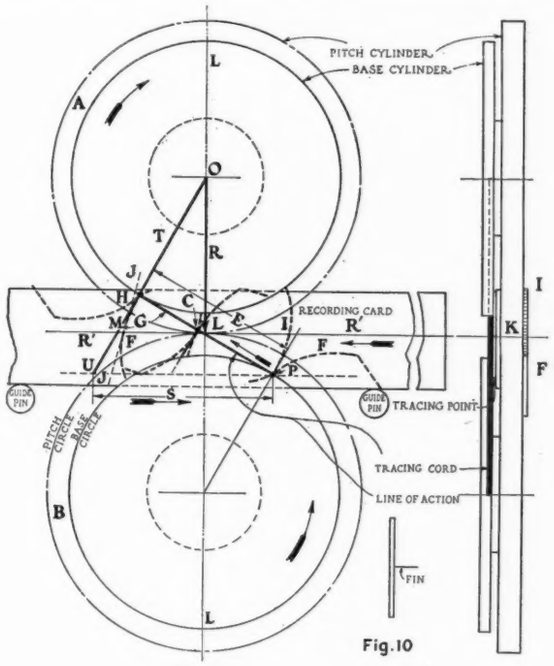


Fig. 9

Fig. 10

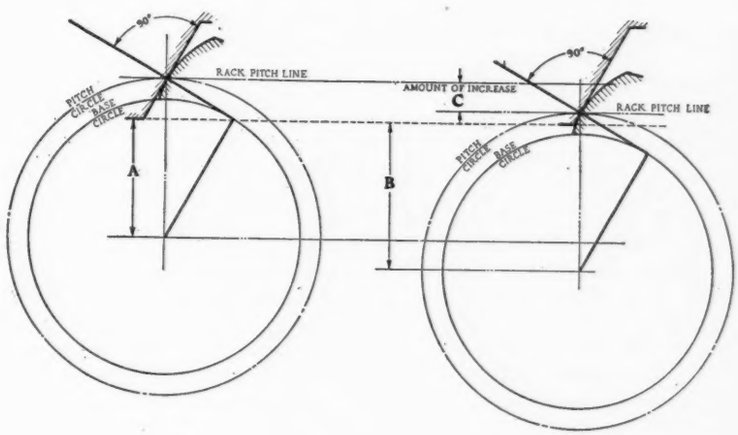


Fig. 12

Fig. 13

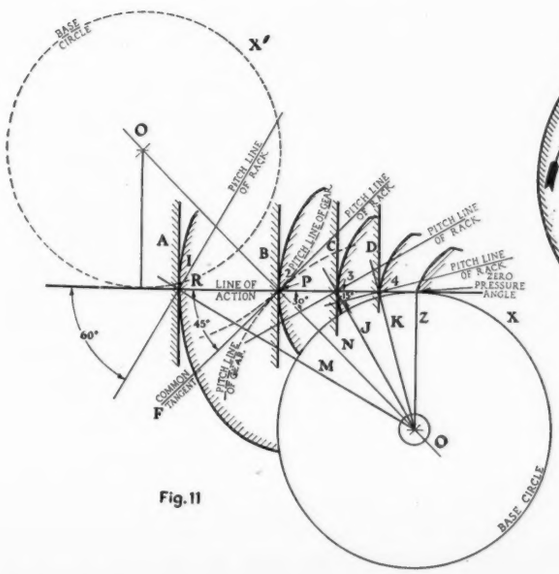


Fig. 11

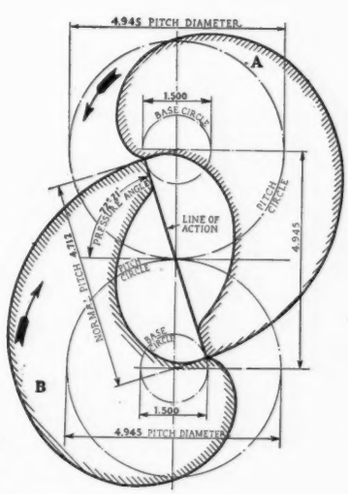


Fig. 14

DIAMETRAL PITCH = .2022 = $\frac{1}{4.954}$

CIRCULAR PITCH = $\frac{3.1416}{.2022}$ = 15.537

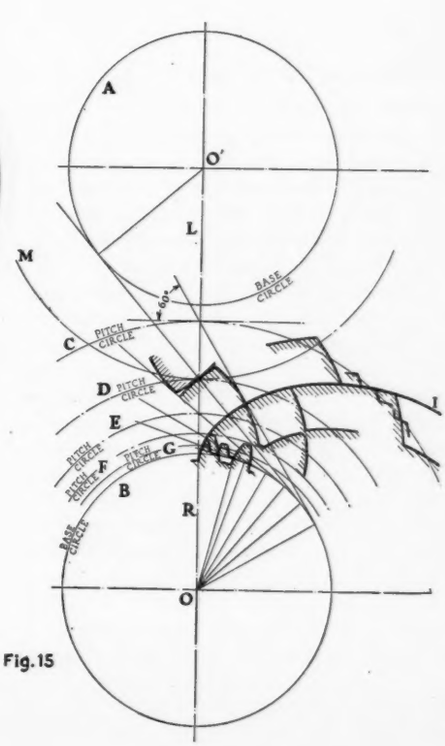


Fig. 15

curves developed from these circles. This is not true when involute and rack are brought into contact. It has been demonstrated and laid down as fundamental that the line of action must lie at right angles to the rack tooth line. Fig. 12 shows these members in mesh at distance A. Fig. 13 shows distance A appreciably increased and indicated by B.

In order to keep the line of action at right angles to the rack face, the pitch point has moved a distance equal to C, and established a new position for the rack pitch line. It is noteworthy that increasing the distance of base circle center from rack has not affected the pitch circle of the involute. From the foregoing we may make the following conclusions concerning the involute curve, the term involute being used in a broad sense, as being of an indefinite length, and not confined to our usual conception of a gear tooth:

Properties of the Involute

The involute is wholly determined by the diameter of the base circle.

An involute moving about its base circle center imparts rotative motion to a contacting involute in the exact ratio of their respective base circles.

An involute has no pressure angle until brought into contact with another involute or a rack.

The pressure angle is determined by the center distance of the base circles.

The pressure angle once established is constant.

An involute has no pitch diameter until brought into contact with another involute or a rack.

The pitch diameter of an involute contacting another involute is determined by the center distance.

The pressure angle of an involute contacting a rack is unchanged when the base circle center is moved toward or away from the rack.

The pitch diameter of an involute contacting a rack is unchanged when the base circle center is moved toward or away from the rack.

The pitch line position of an engaging involute and rack is determined by the intersection of the line of action with a line passing through the base circle center and perpendicular to the direction of rack travel.

Fraction of the Involute Used

The involute curve has its origin at the base line, but its length may be anything from zero at the starting point on to infinity. The tracing point carried in a cord, being many times unwound from the base cylinder, may extend the involute to any desired length. An example of involutes developed by unwinding the cord one complete circumference of the base circle is presented in Fig. 14, which results, as shown in a pair of one-tooth gears, in theoretically perfect action. The application of the involutes as here arranged offers an interesting study. Although of little or no value as actual driving members, the extremities at which involute action may take place are here made plain, and the nature of the curve made clearer.

It will be noted that each of the two involutes constitutes an unsymmetrical tooth. If A acts as a driver, turning in the direction indicated by the arrow, B will rotate in the opposite direction. Contact will take place along the tracing cord exactly as in cases previously cited. The length of the line of action represents the circumference of the base circle, and in this case is the normal pitch of the involute. It is rather startling to realize that the circular pitch of these two involutes developed on a base circle of only 1½ in. is 15.537. It is of passing interest to note that the pressure angle must always be 72 deg. 21 min. when a single involute effects complete rotation of a single engaging involute. The pressure angle of 72 deg. 21 min. is excessive, and these curves are obviously incapable of transmitting any but the lightest loads. The diagram, however, is of value in explaining the possibilities of the involute.

Practically to transmit power smoothly and positively from one pitch line to another it is necessary to provide a number of teeth, thus permitting a selection of that part of the involute best suited for the purpose. In Fig. 15 a long involute I has been developed from the base circle B. Any point on this involute may be taken as determining a pitch diameter upon which teeth may be produced, the number of teeth being determined by the service required. Circles C, D, E, F and G. represent such pitch lines. Upon these pitch circles teeth have been drawn and one side of a tooth upon each pitch circle is composed of involute I. Teeth of various pitches have been drawn to make plain the possibility of a wide choice. The pressure angle increases as the larger pitch diameters are utilized. In the case of circle C it has reached 60 deg. If, after due consideration, it is decided to produce teeth on circle D to run with similar teeth on a pitch circle of identical diameter, it is necessary first to establish the center distance. Since the two gears are to be of equal pitch diameter, this center distance is determined by making L equal R. Then the center of the mating gear is at O′. A base circle A described from O′ and having the same diameter as B becomes tangent to the line of action. Involutes developed from this second base circle A and so spaced on line M as to accord with the tooth spacing on D will operate satisfactorily, provided—

1. That there is no involute interference.
2. That there is an ample arc of action.
3. That excessive slippage is avoided.
4. That a proper pressure angle is selected.

These four points are of vital importance in our standardization work, and each will receive careful attention.

Base Circles and Center Distance

The use of diagram 15 is an effort strongly to emphasize that the base circle is root and seed of the involute and is an attempt to ground our thinking in terms of base circles and center distances. These are the fundamentals, and they should not escape us. On the other hand, it is not recommended that the procedure followed in Fig. 15 be used as common practice. The base circle-center distance attitude of mind is most important in determining the standards. Once the best portion of the involute is determined, center distances may be standardized, determined from the diametral pitch employed, thus following present-day practice.

Two engaging involutes contact along their line of action, and the driver, if uniformly rotated, imparts uniform rotation to the driven. If, however, the involute length is so great as to extend beyond the point of tangency of the base circle and line of action of the mating gear, the uniform rotation of the driven member ceases. The involutes are said to interfere. The point of tangency is called the interference point. In Fig. 16 two involutes, I and F, are assumed to have been contacting steadily along their line of action, the driver I causing uniform rotation of F. When point J is reached, all involute action ceases, since obviously involute F cannot extend below the circle upon which it has been developed. The continued, uniform rotation of A causes I to drive B, the contact of F being always at J. For purposes of illustration the involute length is determined by a 4-in. radius. The base circle radius is 2 in. With

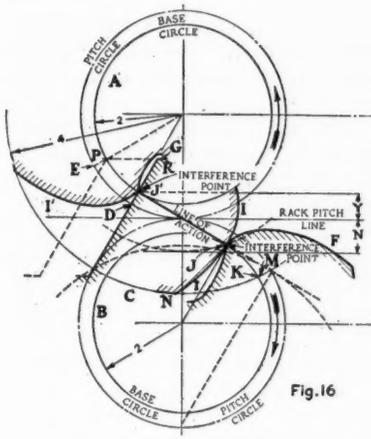


Fig. 16

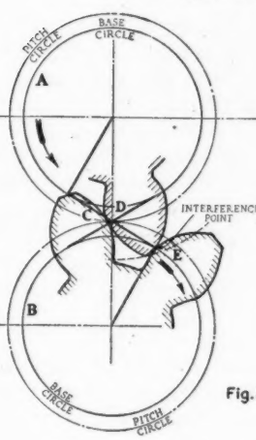


Fig. 17

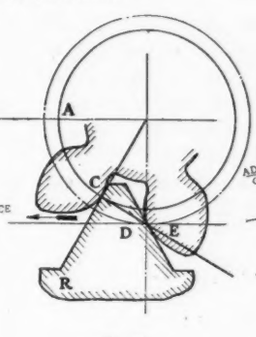


Fig. 18

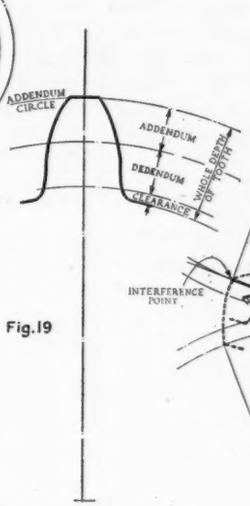


Fig. 19

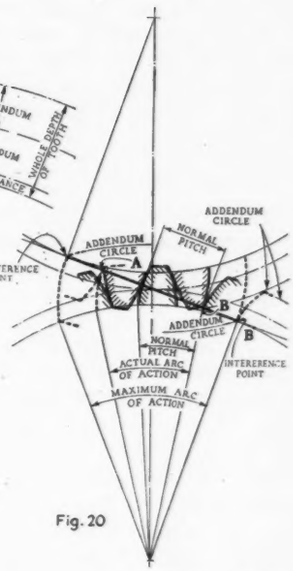
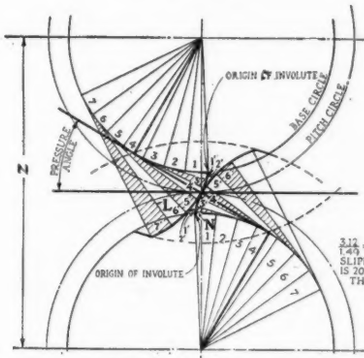
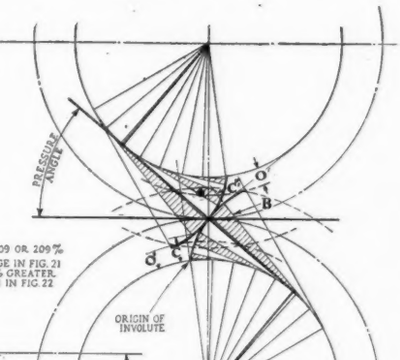


Fig. 20





3.12/1.41 = 2.09 OR 209% SLIPPAGE IN FIG. 21 IS 209% GREATER THAN IN FIG. 22

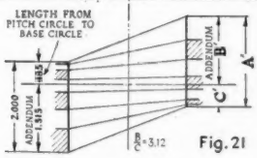


Fig. 21

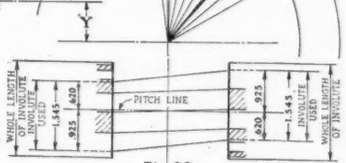


Fig. 22

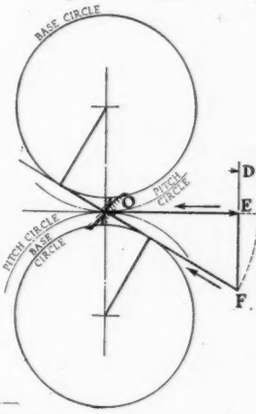


Fig. 25

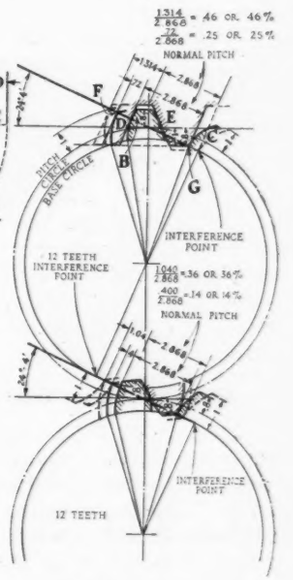


Fig. 26

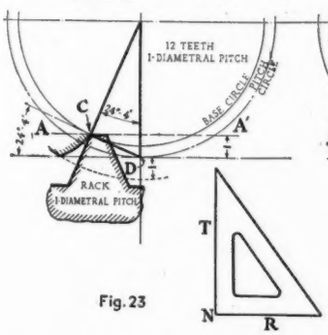


Fig. 23

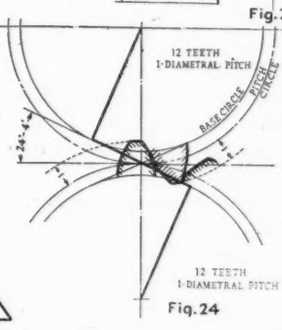


Fig. 24

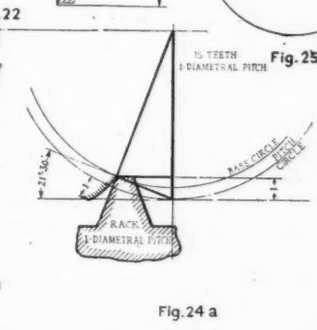


Fig. 24 a

these radii it is plain that as A is rotated a point at the 4-in. radius will move twice as far as a point at the 2-in. radius. A tracing point carried on the line of action will, after arriving at J, be wound upon base circle B, its path thus bending inward and away from the straight line representing the line of action. If this tracing point is assumed to have traveled from J to K (which is the intersecting point of base circle B with circle C) it is apparent that a point in C will have moved twice this distance. If, then, a distance twice JK, indicated by NM, is laid off on circle C, beginning at point N, which represents the end of involute I, it is found that M, representing the extremity of this line, lies outside the base circle B. To have moved in unison J and N should have come together at K. Actually when J has reached K, N has arrived at M. This means that, as A is uniformly rotated, the rotation of B is gently accelerated.

In this same figure a rack tooth R is shown engaging involute I'. If a point on base circle A moves from J' to P, a point on the pitch diameter moves the distance DE, as does also any point on the rack pitch line. Laying off this distance on a line parallel to the rack pitch line and passing through the end of the rack tooth at G, the left-hand extremity is located outside the base circle at P. This again evidences interference. To entirely avoid interference the rack tooth should be shortened to length Y when operating with I'. When I and F are operating together, the involute length should equal to N. The difference in Y and N is appreciable, indicating the greater tendency of the rack tooth to interfere.

When involutes take the form of symmetrical teeth, employed in the transmission of power, the presence of interference prevents operation. This is made plain by Figs. 17 and 18. The acceleration of the driven member B, Fig. 17 (as explained by Fig. 16), is prevented by positive contact of teeth C, D and E; likewise, in Fig. 18, the rack R driving A cannot accelerate the rotation of A by reason of the contact of teeth C, D and E. This assures that gears and racks with teeth extending beyond the interference point will positively lock, becoming inoperative.

The addendum of a gear tooth is known as that tooth length which extends above the pitch circle. The deden-

dum is the tooth length below the pitch circle and equal to the addendum. The clearance represents extra depth of cut to assure space between the bottoms of the teeth and the ends of the mating teeth. The sum of the addendum, the dedendum, and the clearance equals the whole depth of tooth. The circle representing the outside diameter of the gear is sometimes called the addendum circle. Fig. 19 makes plain the application of the various terms.

Arc of Action

The arc of action is that arc through which a gear tooth moves from the point at which it first contacts a mating tooth to the point at which the contact ends. Fig. 20 indicates two gears in mesh. Contact in this diagram begins at the intersection of one addendum circle with the line of action (note points B and B′), and ceases at the intersection of the line of action with the addendum circle of the mating gear. (Note points A and A′.) It is important that a pair of teeth shall remain in engagement until another pair can engage, thus taking up the load. If this does not occur, the gears operate with a bumpy, jerky motion, and they are said to fail of continuous action. The convenient term, "normal pitch," has been used to define the distance from one side of a tooth to a corresponding side of the next tooth measured on the line of action. This obviously is the circular pitch of the gear measured on the base circle, since these corresponding sides are traced by points fixed in a cord unwound from the base circle. The normal pitch arc is established by a length on the base circle equal to the normal pitch. It is evident that the actual arc of action must be greater than the normal pitch arc to assure continuous action. In the case shown the actual arc of action greatly exceeds the normal pitch arc. The maximum arc of action is obtained when the addendum circles pass through the interference points, as indicated by the dotted lines in the drawing.

Reduction of Sliding Action

The slippage is an element which deserves careful investigation. It obviously should be reduced to a minimum, approximating rolling action as nearly as possible. In Fig. 21 two involutes developed on base circles at center distance Z are in contact at the pitch line. Beginning at the involute origin the base circles have been spaced in equal divisions, as indicated by Nos. 1, 2, 3, 4, etc. If we still think of the cord with its tracing point, it is plain that when unwound from arc No. 1 it has developed the involute length 1′. It is of great importance to note that although 7 exactly equals 1, the length of involute 7′ is several times greater than 1′. It is also plain that when these angles have moved to such a position that lines L and N, representing the tracing line, lie in the line of action, length 1′ will begin to pass over length 7′. An angular movement equal to 1 of the base line divisions causes 7′ to pass completely over 1′. The difference in these two lengths evidences excessive sliding. From this it is evident that the extremely short length 1′ is responsible for a very considerable arc of movement. It is noteworthy that lengths 4′ contacting near the pitch line are identical, but due to the position they take a slight slippage occurs. The straight line diagram shown in the lower position of this figure furnishes a simple and convenient means of comparison. The percentage of slippage is here indicated. In Fig. 22 the same base circles and involutes are employed, but the center distance is increased an amount Y. The effect of this is to greatly increase the pressure angle, and it results, as reference to the lower diagram will evidence, in a great reduction in slippage. Although the total length of the involute is identical with Fig. 21, less of the involute is utilized, having the effect of a shorter tooth.

Attention is called to the marked bend of the involute near the base circle. The straight length C laid off on a radial line passing through the origin of the involute departs markedly from the involute. The same length C′, laid off perpendicular to line B, deviates but little from the curve. It is plain that the farther the involute extends from the base circle the more nearly it approaches a straight line. The nearer two mating involutes approach a straight line, the less they slide upon each other, as has been evidenced by the slippage diagram. The greatest curvature is near the base circle. Therefore, this portion is most responsible for tooth slippage. It may be logically concluded that the active profiles of engaging teeth should be kept as far as practicable from the base circle.

The pressure angle is of great importance in determining an interchangeable system. Together with the addendum, it determines the possible range of involute action between the various members. It is common to make the addendum equal the reciprocal of the diametral pitch. For example, the addendum of an 8-pitch gear is made ⅛ in. As a starter it may be well to determine the necessary pressure angle to secure interchangeability of all members from 12 teeth to a rack when the addendum equals the reciprocal of the pitch.

Minimum Pressure Angle

The two extreme members—namely, the 12-tooth pinion and the rack—obviously present the limiting case. In Fig. 23 is shown a 12-tooth pinion of one diametral pitch. The problem is to find the pressure angle which shall fix the interference point in line AA′. Using a right triangle, as shown, let the point N lie in line AA′. Shift the triangle about, keeping N in AA′ until side T passes through point O and side R through D. Draw CO and CD. The angle COD is the desired pressure angle. It may be mathematically checked by simple triangulation. In Fig. 24 a pair of 12-tooth pinions is observed to clear the interference points by a wide margin. Obviously a 24-deg. 4-min. pressure angle assures an interchangeable system.

One factor to be considered when determining the pressure angle is its effect on bearing loads. The example shown in Fig. 25 may serve to illustrate this matter. A pitch line force EO coming against the inclined surface of a gear tooth resolves itself into force FO, acting along the line of action, as shown. D graphically indicates the amount of load increase by reason of the pressure angle. It is apparent that the increase is in ratio of EO: FO of the right triangle OEF, and is, therefore, proportional to the secant of the angle. The table drawn up herewith gives the secants of several angles. The column on the right compares the load with 14½ deg. in terms of percentage.

Angle	Secant	Comparison of Load with 14½ Deg. in Percentage Terms
14½ deg.	1.0329	
17 deg.	1.0456	1.2 per cent
20 deg.	1.0641	3.0 per cent
22½ deg.	1.0823	4.8 per cent
24 deg. 4 min.	1.0952	6.0 per cent
27½ deg.	1.1273	9.1 per cent
30 deg.	1.1605	12.3 per cent

In Fig. 26 are shown two 12-tooth pinions in mesh. The pressure angle is 24 deg. 4 min. Above is shown a rack engaging a pinion. In full line the teeth of both pinion and rack are shown having an addendum of 0.8 in. The normal pitch is 2.868, and the excess engagement of the two pinions is 0.4 in. This indicates 14 per cent

more travel than is actually necessary to effect continuous action. The rack and pinion, as shown above, have 25 per cent more than is required. If the addenda are made 1 in., as indicated by dotted lines, the excess action is considerably increased, as is indicated by these figures. It is to be noted that the teeth in both pinion and rack clear the interference point by a good margin when the addendum of both is 0.8 in. When using this pressure angle of 24 deg. 4 min., the load on the bearing is 6 per cent more than when employing the 14½-deg. angle. This increase is little and may be considered negligible.

It appears from an investigation of this kind that a 24-deg. pressure angle with an 0.8-in. addendum may furnish a highly satisfactory interchangeable standard.

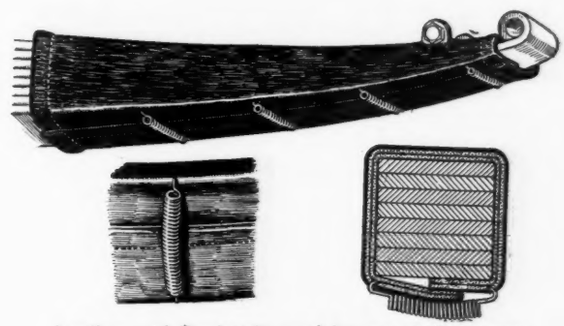
It is not believed that this matter can be easily and cheaply settled. Much experimental work should be carried on in a painstaking and unselfish fashion. Undoubtedly it would best be done in a place fitted up for research work, all experiments being made on the same devices, in the same way, and careful records kept of results. In judging the all-around performance of gear teeth, the matters of noise, durability, strength and other lesser factors should influence our conclusions. If we as a society are really sincere in this task, we should make every effort to carry on the work to completion. Unquestionably the money cost of such work would be considerable, and this matter of finance must necessarily receive our attention.

This paper has dealt largely with an interchangeable standard. It is undoubtedly a matter of paramount importance. The special case arises, and recently has been much discussed. It is perhaps timely to direct attention to the fact that formulas assuring the very best pressure angle and tooth proportions for any specified pair or pairs of gears may be easily worked out. Possibly a secondary standard covering these special cases would be advisable, and prove to be part of the work. There is nothing mysterious about these special cases, and, further, they may all be handled by any of the commonly used processes of to-day, thus making the possibility of their production open to all.

A New Spring Cover

OF late years spring covers have come into use mainly abroad, but also, to a certain extent, in this country. The object of these covers is to exclude dirt from the contacting surfaces of the spring leaves and maintain a film of lubricant between them. If no means are provided for maintaining this film, the leaves become dry and rusty, the flexibility of the spring changes and the spring is very apt to squeak.

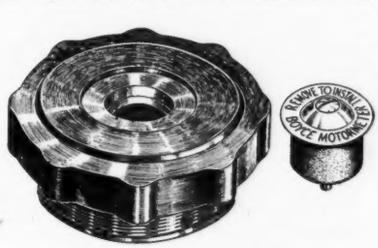
A spring cover of very simple design, which is produced by the Ideal Garage, Inc., is shown by the accompanying illustrations. It is made in both leather and pantasote, the latter in two different weights. On the inside the cover is lined with a heavy felt which holds oil in absorption. The covers come in flat form ready to be wrapped around the springs, one cover for each end of a semi-elliptic spring. One side and one end of each cover are lap-seamed, while the other side and end are unseamed, thus making it easy to adapt the covers to odd size springs. These covers are held on the springs by coiled steel springs, the ends of which hook into holes in the leather, etc. It has been found quite unnecessary to rust-proof the small springs, as they are protected by a light oil film which constantly covers them. The covers are made in three widths and in a considerable number of lengths.



Leather and Pantasote used in new spring cover

Merchandising Accessories

INSTALLATION difficulties have often retarded accessories sales to a considerable extent. Accessory manufacturers in an effort to overcome this sales resistance have attempted to get car manufacturers to construct the original vehicle in such a way as to render installation easy. In some cases, the accessory manufacturer has gone further, however, and has offered to bear part of the manufacturing expense necessary to render less difficult the installation of the particular device in marketing of which he is interested.



How Moto-Meter installation is facilitated

An interesting instance of this kind is the device recently adopted by the Boyce Moto-Meter Co. to render installation easier and to decrease sales resistance. This company has devised a rubber plug with metal top which fits into a ¾ in. hole in a radiator cap. The metal cap bears, in small letters, the words "Remove to install Boyce Moto-Meter."

The Boyce company has offered to supply these plugs free of charge to radiator cap manufacturers who will use them. The plug gives the radiator cap a pleasing appearance and the advertising feature is not visible except upon close examination. Installation of the Moto-Meter is rendered simple, however, since the plug can readily be removed by a slight pressure of the finger. The idea is interesting as a practical sales promotion method.

High Speed Riveting Hammers in Automobile Production

Many operations accomplished in manufacture of various parts of cars with this tool. Delivers rapid succession of strokes without overheating, is claim. Simplicity and ease of handling make it possible for women operators to work with the hammers. Various operations are described.

No other branch of industry has confronted machine tool designers and the engineering profession in general with so many difficult problems as the automotive industry. Automotive manufacturing has attained its present high standard only as a result of continued research and experiment looking toward improvement in the production of every part which enters into the complete product.

Many production engineers are said to look favorably upon the use of high speed riveting hammers for upsetting solid and hollow studs, rivets, pins, etc. These hammers deliver what is described as elastic vibrating strokes at high speed. The rapid succession of blows does not overheat the riveted stock, as has sometimes been feared they would; the rivets are not subjected to a slow, heavy pressure to fill the rivet hole, but, instead, the action of the high speed hammers causes the shoulders to hug tightly and the revolving peening action of the hammer first makes a wedge of the protruding stock and then quickly forms an oval or a round head, or fills a countersink to form a flush head.

The following notes on methods of application to familiar operations in the automotive industry and time studies in connection therewith may prove of interest. The operations described cover a very considerable range of work, calling for the delicate strokes necessary for upsetting a 1/16-in. pin or rivet, to the heavy, powerful strokes necessary for heading a 1-in. case-hardened tractor chain pin.

Fig. 1 illustrates the upsetting of circuit breaker spools onto their bases in the plant of the Electric Auto-Lite Corporation. The studs are tightly upset in four seconds each. Tending of the machine is said to involve a low fatigue factor, which makes it possible for women operators to do the work. Another operation in the electrical equipment branch of the automotive industry is the riveting of tungsten contact points to the contact levers, etc., which is done at the rate of one point per second. A tight fit and a good finish are obtained in this operation, and no chipping needs to be done.

In riveting assemblies of automobile hardware (as used on closed car bodies), starters, safety signals, carbureters, etc., women operators are obtaining speeds of one rivet per second on sizes up to 3/16 in. diameter.

Fig. 2 represents the riveting of brackets which hold the lever and link of an internal brake assembly, the photo having been taken in the plant of the Raybestos Co. The length of the brake bands is 18 in. and they are ¼ in. thick. Sixteen rivets are required per brake band to assemble the lever and link, and 300 rivets are

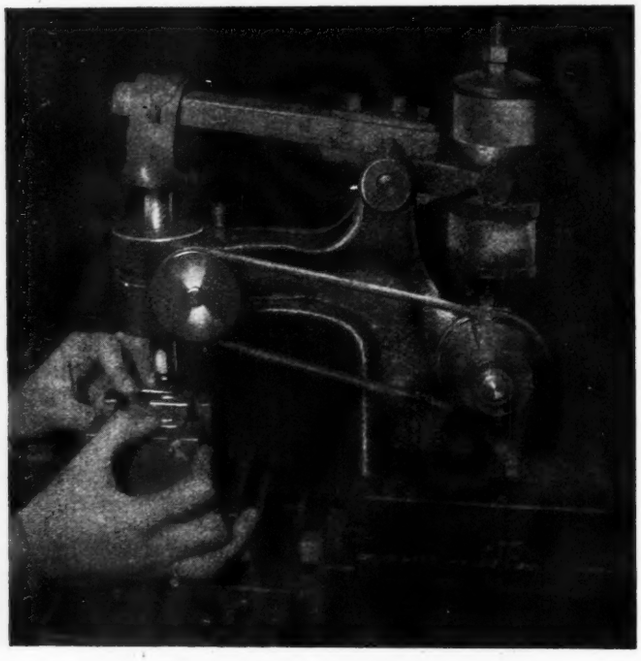


Fig. 1—Upsetting of circuit breaker spools onto their bases

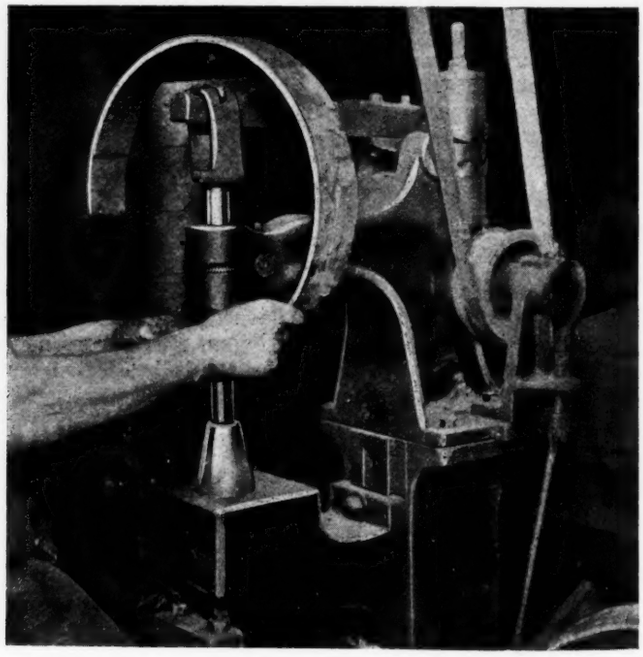


Fig. 2—Riveting brackets that hold lever and link of an internal brake assembly

Fig. 3—Differential gear in the riveting hammer

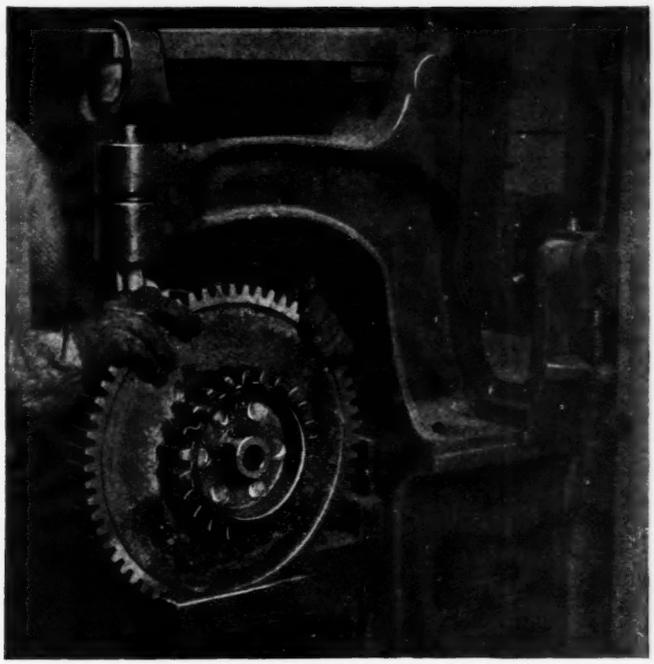


Fig. 4—An operation on tractor gears

headed every hour. Brake lining is riveted with copper rivets and drawn up. For riveting up brake bands, the hammers are sometimes arranged in gangs. Thus, in the plant of the Timken-Detroit Axle Co., where four pieces are riveted to each band with fourteen 3/16-in. iron rivets, the work is done in a number of machines located side by side. First, a malleable brake support is secured to the middle of the band with six rivets; next two clips are secured in position, one on each end, with three rivets apiece; finally a sheet metal punching is fastened in position with two rivets. A boy loads the rivets into the fittings and keeps two hammers going.

The riveting of automobile rebound clips is performed with a high speed riveting hammer at the plant of the Perfection Spring Co. The shanks of the clips are 3/8 in. in diameter, and though the work is comparatively heavy, production is at the rate of four springs per minute. Actual riveting time is only 8 seconds per spring.

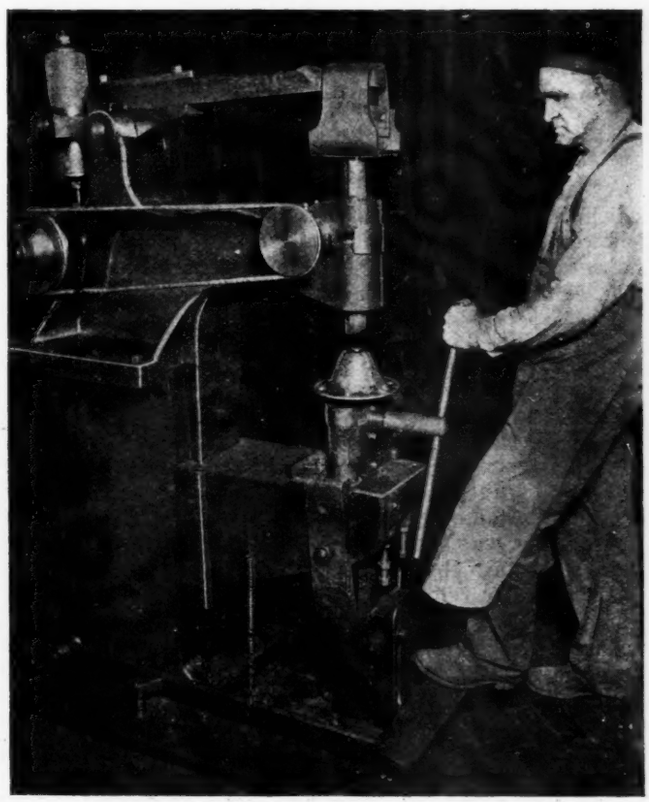


Fig. 5—Securing driving flanges to rear axle shafts of three-quarter floating axle

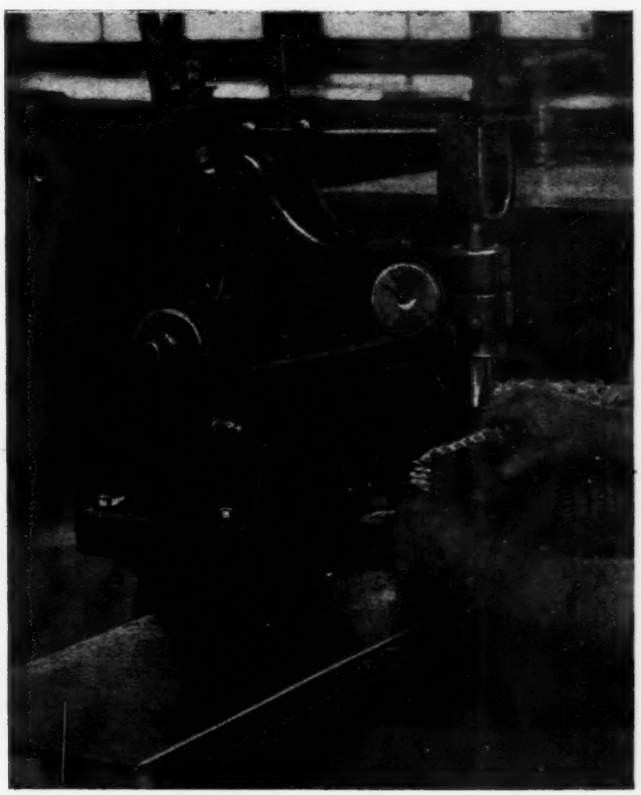


Fig. 6—Upsetting chain link pins with the hammer

At the plant of the Chevrolet Motor Co. three bosses are riveted to each brake flange plate, which is a sheet metal stamping ⅛ in. thick. Two of the bosses are of cold-rolled steel of ⅞ in. diameter, while the third boss is square. A gang of three hammers is installed, each performing one operation, and in this way the excellent production of 300 bosses per hour is obtained.

In the manufacture of differential gears the New Process Gear Corp. uses high speed hammers for a number of operations. These differentials are of the spur pinion type and eight studs are used for holding the assembly together. First the side plates, pinions and studs are assembled loosely. The operator places the differential thus put together on a fixture, inserts a locking pin vertically through the central hole, and after the assembly is placed in position in the hammer, one stud is riveted. The operator then withdraws the locking pin, turns the differential case around and rivets a second stud opposite the first one. The riveting is continued until eight studs have been riveted on the top side. The work is then turned over and the opposite ends of the studs are riveted. While the riveted heads are being formed the operator constantly manipulates the gears to avoid binding. One man produces eight to ten completely assembled gear cases per hour. The assembled differential gear in the riveting hammer is shown in Fig. 3.

The R. D. Nuttall Co. secured an order for tractor gears which, according to specifications, were to be cold-riveted. To avoid heat stresses the engineers tried riveting by high-speed hammers. The gears to be assembled had outside diameters of 8½ and 16¼ in., and six ⅝-in. headless iron rods are set in place, both ends being headed over. These ⅝-in. rods were headed at the rate of one every four seconds, and a very tight job was secured. (Fig. 4.)

In the so-called three-quarter floating axles the driving flanges are rigidly secured to the rear axle shafts. At the works of the Reo Motor Car Co. a high-speed hammer was installed for this purpose and as a result the production was quadrupled as compared with the hand riveting formerly employed. The axle drive shaft is of high carbon steel 1¼ in. in diameter. The shaft ends are cut with four splines and when the cap is in place there is 3/16-in. stock to rivet. By means of the high-speed hammers these shaft ends were upset in one minute each, as illustrated in Fig. 5, whereas formerly when sledge hammers were used, it took exactly four minutes.

Riveting of nickel steel ball studs to steering knuckle arms is done with a high-speed hammer at the plant of the Saginaw Products Co., a branch of the General Motors Co. The ball has a ⅝-in. shank and is forced into the arm by an arbor press. About ⅛-in. stock is left to rivet and the hammer turns the head over to ¾ in. diameter. During a five-hour test run a production of 2200 was attained. This job is of particular interest for the reason that the ball studs are made of comparatively hard material.

Upsetting chain pins is an operation for which high-speed hammers have been used for a long time. At the plant of the American High Speed Chain Co. the pins used for holding together the links of ¾-in. pitch 4-in. wide chains have ends 9/32 in. in diameter. These pins lead through washers over which the ends are headed. An average production of 600 per hour is attained on this size, and on other sizes in proportion. The operation is illustrated in Fig. 6.

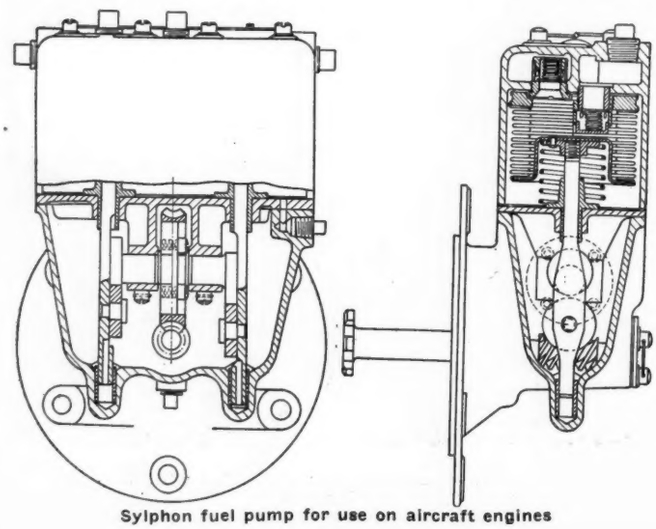
Other parts of motor vehicles in the manufacture of which high-speed hammers are used to advantage are bow top frames, brake drum side covers, roller bearing cages, tire pump plungers, spare tire carriers, folding baggage carriers, lamps, bumpers, oil cup hinge pins, knurled heads on priming valve stems, shackle pins on shock absorbers and automobile jack assemblies.

The above article is based on information furnished us by the High Speed Hammer Co., Inc.

A Fuel Pump Without Glands

THE Sylphon fuel pump was designed to fill the need for a pump which requires no packing gland. It gives a maximum discharge pressure at high speeds and sufficient fuel at any speed, thus doing away with a relief valve. It is built in duplex form so that in case one pumping unit fails the other unit will maintain sufficient fuel supply for all engine needs.

According to the air service information circular nearly two years in flight at McCook Field and a 1400-hour bench test at full capacity have revealed no failures of any kind.



Sylphon fuel pump for use on aircraft engines

A four-pitch worm meshes with a 32-tooth worm wheel which drives the cams. These in turn operate the cam followers attached to the Sylphon. As the worm rotates the worm wheel on the camshaft moves the plungers down only, admitting fuel from the main tank to the Sylphon, which is returned to its original position by the spring designed to give a maximum pressure of 4½ lb. per sq. in. with a closed discharge.

A HARDENED steel ring gage 1 in. long was ground and lapped out at the National Physical Laboratory in England until the internal diameter was 1.0000 in. The outside diameter, which was 2 in., was ground true. A plug gage was ground and lapped down until it could be inserted into the ring, using ordinary hand pressure, and with both the gages clean and free from any trace of grease. The size of this plug was found on measurement to be 1.0000 in. A second plug was then made whose diameter was 1.0002 in. This plug refused to enter the ring so long as the surfaces were kept dry and free from grease, but when lubricated with vaseline it was found possible to assemble the two gages by ordinary hand pressure. By measuring over its outside diameter both before and after the plug had been inserted, it was definitely proved that the ring had been stretched in the process of inserting the gage.

Export Figures Reach High Mark in October

Foreign sales continue to increase in value despite material lowering of prices. New orders make up the shipments instead of old business as was the case a year ago. Spanish and Portuguese countries take 30 to 50 per cent of the total amount exported. An indication of future business.

By George E. Quisenberry*

THE detailed export figures for the month of October, which have just become available from the Bureau of Foreign and Domestic Commerce, are worthy of careful study by all branches of the automotive industries. They reveal, in the shipments of passenger cars, trucks, parts and tires to all parts of the world, numerous tendencies that should claim the interest and close attention of those executives and export managers who are seeking to build up additional markets and further sales for the products now coming out of American factories.

Several explanatory factors must be kept in mind in any consideration of the foreign business in October. The most important, of course, is that the curve of export sales, according to value, continued through that month the sharp upward trend shown since the low point was reached in July—this despite the fact that prices have been lowered materially in the intervening months. It is necessary to go back to the first part of this year, when old orders were being filled, to find shipments appreciably higher, either in dollars or physical volume, than they were in October.

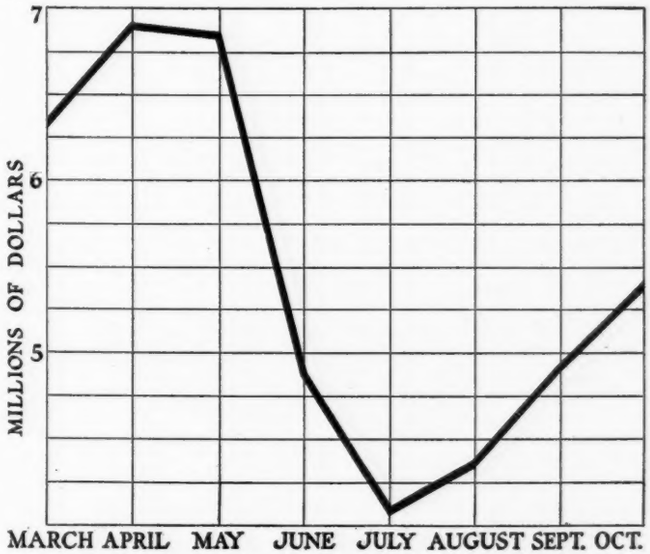
Shipments Are New Orders

Furthermore, sales in that month consisted entirely of new orders. If we could have a curve representing current orders as received by all the producing factories of this country, undoubtedly we would be forced to return to the latter half of 1920 to find a similarly high position. The heavy shipments shown in November, December, January, February, March and perhaps later can be attributed not to new business but to shipments made on old accounts and postponed while domestic demand continued high. But the early months of 1921 saw the completion of all these old contracts, and since the late spring or early summer our foreign sales have been in response to new demands from the automotive centers of the world. That the total was so high in October is ample testimony that our foreign trade is again in the ascendency. This condition is amply borne out by the statements of different exporters who are frank in admitting that present inquiries, orders and shipments are steadily increasing.

The October figures also must be read with an understanding of the Ford distribution system. The statement has been made previously, but it is worthy of repetition, that all American exporters should keep themselves closely posted on all the activities of this pioneer of foreign trade. Thus the October shipments show that Ford is continuing the shipment of parts to Argentina in keeping with the reopened business in that southern country. Ford sales revived in Argentina in September and, as a consequence, the shipment of parts to that republic increased 1000 per cent (from $47,000 to $479,000) between August and September. The demand continued into October and at a high level, which, according to a recent Ford statement, means the difference between 2150 cars and trucks in September and 1650 in October.

The Ford plant in Brazil increased its output in October and the parts shipments to that country went up from $14,000 in September to $95,312 in October. Ford maintains an assembly branch in Denmark and the parts shipped to that country more than tripled the September total. As Spain is the location of another Ford plant, we see a similar enlargement of shipments, the increase having been nearly five-fold. France more than doubled the purchase of parts, and only England and Japan, in each of which assembly branches are located, showed declining purchases in the latter month, although the output still remained at a high level.

The figures for the various countries speak for themselves and any study of them will reveal emphatically that world automotive development again is going for-



The ascending curve shows the value of exported passenger cars, trucks and parts from the United States, the territories of Hawaii, Alaska and Porto Rico not being included.

March	$6,314,498	July	$4,140,130
April	6,948,808	August	4,486,266
May	6,872,756	September	4,923,294
June	4,800,252	October	5,410,739

*Managing editor *El Automóvil Americano.*

Exports of Automobiles, Tires and Motorcycles for October, 1921

COUNTRIES	COMMERCIAL				PASSENGER					TIRES				MOTOR CYCLES	
	Complete Cars		Chassis		Complete Cars		Chassis		Parts	Casings	Inner Tubes	Solid Tires	All Other Tires		
Europe															
Austria	...	.....	...	.....	.....	.....	...	.....	$315	.....	.....	.....	.....	..	....
Azores and Madeira Islands	...	.....	...	.....	.....	.....	...	.....	512	.....	.....	.....	.....	..	....
Belgium	1	$1,000	...	.....	40	$30,395	36	$13,720	12,034	$2,453	$500	.....	$6,793	52	$15,168
Bulgaria	...	.....	...	.....	.....	.....	...	.....	25	.....	.....	.....	.....	..	....
Czechoslovakia	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	..	....
Denmark	...	.....	...	.....	24	20,753	...	.....	338,482	43,899	2,241	$1,592	396	15	3,457
Finland	...	.....	...	.....	1	1,250	...	.....	245	.....	.....	.....	.....	..	....
France	...	.....	...	.....	7	19,971	...	.....	41,425	143,335	110	.....	.....	..	....
Germany	1	535	...	.....	2	3,081	...	.....	529	.....	49	.....	.....	1	300
Gibraltar	...	.....	...	.....	.....	.....	...	.....	50	.....	.....	.....	.....	..	....
Greece	...	.....	...	.....	1	1,200	1	2,500	1,081	5,096	334	.....	.....	..	....
Iceland and Faroe Islands	...	.....	...	.....	.....	.....	...	.....	41	250	.....	.....	.....	..	....
Italy	...	.....	...	.....	2	1,100	...	.....	843	872	.....	.....	.....	34	9,541
Latvia	...	.....	...	.....	.....	.....	...	.....	.....	47	.....	.....	.....	2	800
Lithuania	...	.....	...	.....	.....	.....	...	.....	.....	1,214	202	.....	.....	..	....
Malta, etc., Islands	...	.....	...	.....	9	4,523	...	.....	303	.....	.....	.....	.....	1	225
Netherlands	56	48,502	4	$2,807	30	33,325	1	668	18,391	5,267	60	364	248	23	6,536
Jugoslavia, etc.	...	.....	...	.....	.....	.....	...	.....	242	300	57	.....	.....	..	....
Norway	...	.....	...	.....	4	4,350	...	.....	8,281	13,764	658	744	.....	..	....
Poland and Danzig	...	.....	...	.....	1	700	4	5,060	5,381	1,478	388	.....	.....	..	....
Portugal	...	.....	...	.....	.....	.....	...	.....	1,273	.....	.....	.....	.....	..	....
Roumania	2	874	2	668	11	7,368	...	.....	6,360	.....	125	.....	.....	..	....
Spain	...	.....	...	.....	17	25,275	1	1,001	59,272	39,618	437	.....	.....	..	....
Sweden	...	.....	...	.....	2	3,900	1	175	5,392	29,759	823	520	.....	2	375
Switzerland	...	.....	...	.....	7	4,203	1	591	4,163	65,985	235	.....	65	..	....
Turkey in Europe	1	715	...	.....	7	3,551	...	.....	5,465	384	101	.....	.....	..	....
England	17	17,530	36	40,997	43	46,904	176	78,648	494,427	254,765	19,341	4,015	600	10	2,925
Scotland	...	.....	...	.....	.....	.....	...	.....	3,720	160	.....	.....	.....	..	....
Ireland	...	.....	...	.....	2	1,657	...	.....	11,158	.....	.....	.....	.....	..	....
North and South America															
Bermuda	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	281	..	....
British Honduras	...	.....	...	.....	1	920	...	.....	315	515	30	.....	.....	..	....
Canada	35	45,973	33	59,820	231	305,906	10	15,526	771,999	11,876	1,260	14,027	1,639	22	3,996
Costa Rica	...	.....	...	.....	3	4,500	...	.....	508	324	21	424	.....	..	....
Guatemala	...	.....	...	.....	2	2,500	...	.....	1,523	1,372	23	.....	574	3	466
Honduras	2	13,924	...	.....	6	7,950	...	.....	3,512	1,143	76	403	.....	1	324
Nicaragua	...	.....	...	.....	.....	.....	...	.....	643	1,083	54	.....	.....	..	....
Panama	6	2,482	...	.....	31	31,843	...	.....	3,694	4,972	902	1,250	169	3	666
Salvador	...	.....	...	.....	1	2,439	...	.....	1,432	6,372	60	1,381	.....	1	632
Mexico	82	35,279	95	35,229	617	364,421	8	1,947	82,763	35,287	4,195	1,984	895	4	920
Newfoundland and Labrador	...	.....	...	.....	.....	.....	...	.....	299	269	24	.....	.....	..	....
Barbados	...	.....	...	.....	2	1,325	...	.....	1,394	2,046	130	770	.....	..	....
Jamaica	...	.....	2	782	17	12,402	...	.....	5,431	4,944	419	455	499	..	....
Trinidad and Tobago	...	.....	...	.....	17	10,912	...	.....	8,122	12,982	1,562	1,365	.....	..	....
Other British West Indies	1	400	...	.....	6	3,225	...	.....	2,443	838	82	.....	266	2	300
Cuba	13	6,817	1	460	72	71,532	...	.....	31,505	114,748	12,695	23,624	1,845	..	....
Virgin Islands of U. S.	...	.....	...	.....	1	350	...	.....	791	2,028	151	.....	.....	..	....
Dutch West Indies	...	.....	...	.....	3	1,200	...	.....	450	1,746	248	.....	.....	1	350
French West Indies	...	.....	...	.....	1	437	...	.....	627	3,396	1,033	129	.....	..	....
Haiti	...	.....	...	.....	2	2,300	...	.....	3,238	3,434	351	.....	210	..	....
Dominican Republic	...	.....	1	3,300	6	8,107	...	.....	7,414	3,826	447	59	427	..	....
Argentina	3	10,600	1	1,164	26	39,256	...	.....	357,083	92,240	3,857	1,882	.....	1	277
Bolivia	...	.....	...	.....	.....	.....	...	.....	299	800	175	.....	.....	..	....
Brazil	...	.....	75	283,750	5	5,900	...	.....	95,312	7,397	13	382	.....	..	....
Chile	1	2,620	...	.....	11	5,512	...	.....	14,082	4,160	1,479	1,054	.....	..	....
Colombia	...	.....	...	.....	11	12,902	...	.....	5,747	5,075	543	887	129	..	....
Ecuador	...	.....	2	3,900	2	7,050	...	.....	326	2,078	260	.....	.....	..	....
British Guiana	...	.....	...	.....	3	2,424	...	.....	833	902	133	.....	.....	..	....
Dutch Guiana	...	.....	...	.....	.....	.....	...	.....	187	.....	.....	.....	.....	..	....
Peru	...	.....	...	.....	.....	.....	...	.....	7,809	10,521	550	2,445	.....	1	165
Uruguay	...	.....	10	2,900	2	3,448	...	.....	2,772	17,479	800	.....	.....	6	1,663
Venezuela	2	11,340	...	.....	16	17,102	...	.....	8,729	8,898	1,476	20	261	..	....
Asia															
Aden	...	.....	...	.....	5	2,890	...	.....	535	1,328	.....	.....	.....	..	....
China	6	11,738	1	1,643	10	11,317	2	2,550	10,854	7,863	332	2,376	.....	2	350
Kwantung, leased territory	8	13,650	...	.....	.....	.....	...	.....	54	.....	.....	.....	.....	..	....
Chosen	...	.....	...	.....	1	100	...	.....	.....	132	.....	.....	.....	..	....
British India	1	1,164	...	.....	73	74,601	3	2,700	32,540	86,663	301	50,294	17	..	....
Straits Settlements	...	.....	...	.....	.....	.....	...	.....	4,749	9,462	1,757	5,052	.....	..	....
Other British East Indies	...	.....	...	.....	1	976	...	.....	1,531	281	.....	.....	.....	..	....
Dutch East Indies	2	2,393	5	10,142	45	69,826	...	.....	29,938	29,963	1,413	2,279	.....	46	12,288
French East Indies	...	.....	...	.....	.....	.....	...	.....	.....	2,960	.....	.....	.....	..	....
French Indo China	...	.....	...	.....	.....	.....	...	.....	572	.....	.....	.....	.....	..	....
Far Eastern Republic	...	.....	...	.....	.....	.....	...	.....	300	.....	.....	.....	.....	..	....
Greece in Asia	...	.....	...	.....	.....	.....	...	.....	154	.....	.....	189	.....	..	....
Hejaz, Arabia, etc.	...	.....	...	.....	.....	.....	...	.....	7,963	.....	.....	.....	.....	..	....
Hongkong	...	.....	...	.....	9	35,857	...	.....	2,565	6,144	190	1,670	.....	1	250
Japan	...	.....	50	25,000	17	15,840	100	49,000	40,454	11,808	3,303	3,893	1,860	62	16,868
Palestine and Syria	4	7,701	2	1,150	45	25,789	1	500	6,631	4,671	1,533	432	.....	1	297
Persia	...	.....	...	.....	.....	.....	...	.....	1,379	.....	.....	.....	.....	..	....
Siam	...	.....	...	.....	2	2,500	...	.....	614	682	53	.....	.....	..	....
Australia	...	.....	19	33,756	83	65,456	191	155,672	31,526	7,153	324	4,324	953	110	28,168
New Zealand	...	.....	2	2,959	16	17,933	...	.....	15,489	19,937	119	71	.....	5	1,359
Other British Oceania	...	.....	...	.....	.....	.....	...	.....	675	.....	.....	.....	.....	..	....
Other Oceania	...	.....	...	.....	7	5,037	...	.....	558	63	.....	.....	26	..	....
Philippine Islands	...	.....	...	.....	3	2,750	...	.....	11,658	31,385	1,390	5,391	2,906	1	250
Africa															
Belgian Congo	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	1	185
British West Africa	5	4,556	...	.....	1	808	...	.....	2,862	1,168	121	.....	.....	10	1,030
British South Africa	1	3,000	...	.....	83	96,296	...	.....	32,436	22,409	643	402	.....	16	3,640
British East Africa	...	.....	...	.....	16	15,478	...	.....	1,756	8,261	530	.....	.....	..	....
Canary Islands	...	.....	...	.....	11	9,977	...	.....	3,773	5,136	675	.....	.....	..	....
French Africa	...	.....	...	.....	2	882	...	.....	7,276	.....	.....	.....	.....	..	....
Morocco	...	.....	...	.....	.....	.....	2	912	350	.....	.....	.....	.....	..	....
Portuguese Africa	1	565	...	.....	2	520	...	.....	1,086	.....	.....	.....	.....	3	1,500
Egypt	3	1,311	...	.....	54	27,269	...	.....	11,025	10,723	136	.....	15	..	....
Total	254	$244,669	341	$510,427	1,791	$1,621,471	538	$331,170	$2,703,002	$1,239,589	$71,530	$136,149	$21,074	443	$115,271

ward. The following compilation, however, made up from the October totals of cars, trucks, parts and tires, will show the relative standing of the leading automotive purchasers.

Canada	$1,226,397	Cuba	$262,381
England	956,627	India	248,263
Mexico	561,105	France	203,846
Argentina	506,082	Japan	149,298
Denmark	408,968	Dutch East Indies	145,944
Brazil	392,754	Netherlands	129,384
Australia	298,211	Spain	127,603

The total value of the October foreign trade on cars, trucks and parts was $5,410,739,* with an additional $1,447,268 on tires. No month of the entire year, except January, has shown a larger value of tire shipments than October. June, July, August and September were each exceeded by the value of the car, truck and parts shipments.

Analyzing the figures somewhat further, the detailed information in the accompanying table shows that the Spanish and Portuguese-speaking countries contributed much in running up the surprisingly high totals. In each of the major products these Spanish and Portuguese countries were responsible for from 30 per cent to more than 50 per cent of the total, the comparisons being:

	Cars		Trucks		Parts	Tires
	No.	Value	No.	Value	Value	Value
Spanish-Portuguese†	822	$638,435	294	$413,765	$700,600	$461,995
World total	2,229	1,952,641	595	755,096	2,703,002	1,447,268

To complete the study of the October figures it is necessary to consider also the financial and economic aspects of the various countries. An analysis of past business is of no value unless it points the way to the future or reveals something of present value. The October business is past, but what does it show for to-day and to-morrow?

The international political, economic and financial situation is vastly different to-day than it was in September and October, when orders for the latter month's shipments were placed. The Irish problem, fraught as it was with such grave dangers for the peace of England, Europe and the world, has been settled, or is in an immediate way to be settled. The Washington conference is arriving at an international understanding that will be of lasting benefit to every country. France and England are reported near an accord on European problems, and Germany, according to the latest newspaper reports, will pay the next indemnity installments due early in 1922 and then will be accorded a three-year moratorium, with stoppage of the printing presses and a consequent stabilization of her finance. None of these things and many others had come about, or were in immediate prospect, to show the foreign buyer in September and October that more settled conditions were in the offing. To-day they are signposts along the road to international stability and a return of world-wide prosperity.

What has been the result? At the beginning of October the British pound sterling was quoted in the United States at, roughly, $3.73, with automotive exporters declaring that should it reach $4 (less than 20 per cent below par) they would be assured good business to all of the English dominions. As this article is written, in the second week of December, the pound has climbed upward to $4.08,* and some financial publications are talking about its further increase to $4.25. French exchange is pointing upward, and the currency of Spain has progressed so much since October that now it stands at a record height for the year. All of the other neutral countries of Europe are appreciably higher in the foreign exchange markets, and Germany has passed "Black Thursday," with all that it may mean to international finance. Some South American currencies are quoted higher or have reached a certain stability that will enable her importers and dealers to gage their future business and handle it with less fear of violent fluctuations. The same is true of the Far East, and this betterment, in all except a few countries of the world, is borne out by the weekly and monthly cable and mail reports of trade associations, banks and governmental agencies.

Export managers and executives are determining now their sales and production policies for the coming year. Upon the analysis made of the present evidence must depend their decisions and none of the factors shown here should be overlooked.

*Hawaii, Alaska and Porto Rico not included.
†Porto Rico not included.

*Sterling exchange touched $4.24 on Dec. 12, standing then just 12 per cent below par.

Cracking Increases Gasoline Production

IN a recent issue of the *Wall Street Journal* it was said that in the first eight months of 1921 gasoline produced in American refineries represented in quantity 28 per cent of the crude oil run to stills, compared with only 13 per cent in 1915. The percentage has increased gradually each year, but has been accompanied also by a decrease in volatility.

Gasoline became the chief product of crude oil in 1915 in value. In 1918 the value of gasoline produced equalled that of all other products combined. Its value totalled $684,000,000. Since 1918 it has become an increasingly important factor, until now the gasoline market goes a great way toward determining the status of the oil industry as a whole.

During the early part of 1921 the oil industry suffered a decided slump. Consumption of oil products here, with the exception of gasoline, was unusually low. Exports of all products, including gasoline, fell off considerably, but gasoline consumption in the United States continued active. This fact has played a large part in the current recovery in the oil industry.

The steady increase in consumption of gasoline in this country is in line with the gain in number of automobiles in use. It is estimated that 90 per cent of the cars in use are in the United States.

Domestic production of gasoline has increased fourfold during the last six years. Consumption has increased to a corresponding degree. The following table shows in barrels the production in the United States, domestic consumption, exports and percentage of gasoline to crude run through refineries by year since 1915 (giving first eight months of this year):

	Production	Domestic consumption	Exports	Gasoline produced to bbls. crude run in U. S.
1st 8 mos., 1921	81,542,000	70,269,000	8,766,000	28%
Year 1920	116,251,000	101,343,000	15,633,000	27%
" 1919	94,235,000	81,781,000	9,098,000	26%
" 1918	85,007,000	74,512,000	12,538,000	25%
" 1917	46,719,000	34,783,000	9,902,000	21%
" 1916	49,021,000	27,037,000	8,473,000	19%
" 1915	31,755,000	26,077,000	6,943,000	13%

The Sales Promotion Movement of the A. E. A.

Some of the methods adopted in the campaign to increase sales of equipment might apply to other branches of the automotive industry. "Ask 'Em to Buy," is the slogan of the movement which includes educating all the salesmen in the business. Success will mean increased factory output.

By Neal G. Adair*

THE automotive industry has been made the laboratory for an experiment in merchandising which is going to attract constantly widening attention as it progresses. It is the sales promotion movement of the Automotive Equipment Association, which is only half a year old, but which already has made its influence felt in half the American states and several Canadian provinces.

The movement is unusual in that it is a joint undertaking by manufacturers and wholesale distributors of a group of products. The object, of course, is to build the businesses of both manufacturers and wholesalers by broadening the market for these products, a process which brings into the plan the thousands of retail agencies which furnish the industry's points of contact with the consuming public—automobile and truck dealers, garagemen, repairmen and equipment dealers.

Necessarily the basis of the plan is education. Obviously the focal point for the application of the educational process is the point of contact with the consumer. If the retailer is a better merchant he will sell more goods to the consumer and the wholesaler and manufacturer will benefit along with the retailer. But the sales promotion organization has not made the mistake of trying to "uplift" the retailer. It has studiously avoided any implication that it was going to do something to him. More than that, the sales promotion leaders have put the manufacturing and wholesaling elements of the industry on record as confessing that they need merchandising education as well as the retailer. Confession is not only good for the soul, but it makes friends for the confessor, and the A. E. A. has got away to a flying start in its newest and greatest work because it has made the retailer a partner in, rather than a mere object of, the better merchandising campaign.

Campaign Working on Salesmen

Manufacturers' salesmen doing missionary work in the wholesale and retail field, jobber salesmen and retailers and their salesmen are primarily the subjects upon which the campaign is working, but even the manufacturer and the jobber have been included as needing education—and they are getting it.

This article will attempt to tell something about the methods by which the sales promotion campaign is being worked out. It will suggest some possible applications of the sales promotion idea to the automotive industry in general.

*Editor *Motor World.*

The sales promotion organization has hit upon two things which have attracted attention to its work, humanized it and popularized it. One is a slogan; "Ask 'Em to Buy" is the campaign watchword. The other is a string of numerals after a dollar sign, which he who runs always reads and wonders how many he can corral for his own pocketbook; $250,000,000 is set up as a year's business for the industry to aim at.

A Gratifying Response

There is more than a slogan in "Ask 'Em to Buy." The manufacturer and jobber have spent years urging retailers to sell. The retailer has sold some, mainly what customers asked him to sell and sometimes a little more, but largely he has been answering injunctions to sell by inquiring how. The answer is "Ask 'Em to Buy," and there has been a gratifying and somewhat surprising response to this information by dealers and garagemen who have been selling cars, repairing cars and garaging cars and, through force of habit, stopping there while automotive equipment collected dust on their shelves until people asked them for it. The slogan by no means is all there is to the campaign, but it furnishes something to talk about and center interest in, and a practical yet human motion picture has been built around the phrase as one of the chief tools for doing the work of the campaign.

As for the figures, they represent sales of $25 worth of automotive equipment per year to each of the 10,000,000 cars in the United States and Canada—a potential market of $250,000,000 for the campaign and the industry to aim at. This is just a rough estimate, but it is something definite to talk about.

The campaign organization and methods are simple. We have become so used to finding a ponderous "secretariat" connected with almost everything in the way of organization that it is refreshing to discover that the staff which has undertaken extension of sales promotion in the equipment field all over the United States and Canada has only four members. There is the merchandising director, Ray W. Sherman, an assistant and two secretaries. They constitute the entire paid organization. In general supervision is a committee of five members of the association, serving without pay.

This leads to the question—Who is doing the work? The answer is as refreshing as the discovery of the smallness of the staff. The industry is doing the work. There are to be in this undertaking no hundreds of thousands of dollars spent on field workers and propaganda. The automotive equipment industry is organizing itself to do its own work of broadening the outlet for

its products and increasing the profits made from them. The ultimate goal is to make every manufacturer and jobber sales executive a promoter, through his executive position, of the educational work of the campaign, and to make every manufacturer's and jobber's salesman an active educator, carrying to retailers the story of the campaign with its admonition to "Ask 'Em to Buy" and its information as how this can be done.

The association could have spent upward of $100,000, perhaps more, on an army of field men who might have been able to reach each of the retailers once within a year with the sales promotion story. The story would have been told once and by a man whom the retailer did not know nor trust. Instead it is training the jobber salesmen and those of the manufacturer who come in contact with retailers to deliver the message. They will deliver it many times within a year and the delivery will be made by men known and trusted by the retail trade.

Relaying the Message

The merchandising director is touring the country, presenting the sales promotion message in person as rapidly as possible to territorial groups of jobber salesmen and manufacturer salesmen whenever the latter are available. Jobbers and their sales managers who have heard the story are using the prepared address of the department to present the story in territories which the merchandising director has been unable to reach. The jobber salesmen, in turn, are carrying the message in person to their customers. In addition, there is a supplemental work in the appearance of the merchandising director, jobbers and salesmen before dealer meetings. The organization of state vice-presidents of the A. E. A. is handling the details of the work, territory by territory, arranging meetings of jobber and dealer groups. And always reinforcing the spoken word is the "Ask 'Em to Buy" film, which has been duplicated several times and which will go the rounds of the various distribution territories until the entire trade has watched it unfold the story of the jobber salesman who showed a garageman the profit opportunities in automotive equipment merchandising and demonstrated how they could be turned into money in the cash drawer.

The campaign is presenting to the trade practical, concrete information about successful methods of advertising, displaying, demonstrating and selling automotive equipment. Details are not necessary here.

The enthusiasm with which the A. E. A. membership, manufacturers and jobbers, recommitted itself at the November meeting to the sales promotion movement inaugurated in mid-summer promises country-wide cooperation of a nature that gives the headquarters staff, small as it is, a little more than an even chance of accomplishing its task.

Will Aid the Industry

The enthusiasm of the membership is not difficult to understand. There is nothing philanthropic about the campaign. It won't hurt the motoring public, which is being asked to buy only tried and proved equipment which will improve the operation of its cars. It will help manufacturers, jobbers, retailers and their employees, which is fundamentally the only reason for the campaign, a selfish reason and, when all is said and done, the only kind of reason that will hold men and corporations together in any sustained co-operative effort.

The campaign is not wholly without propaganda, or something that approaches it. For the manufacturer and jobber, members of the A. E. A., there is a merchandising department in *The Leader*, bi-weekly organ of the association. For the manufacturers' and jobbers' salesmen there is a bi-weekly merchandising organ, *The Automotive Equipment Merchandiser*. For the retailer there is an illustrated book of 32 pages on automotive equipment merchandising. These publications go only to people who will use them. A. E. A. members naturally follow *The Leader* issue by issue. Their salesmen get *The Merchandiser* regularly through their sales managers. Dealers receive the merchandising book only after they have become sufficiently interested in the campaign to ask a jobber salesman for a copy, and then they have to pay 15 cents for it. In addition there is the "canned" address for meetings, which headquarters sends out to jobbers or their salesmen who ask for it to use in their territories.

Briefly, this is the story of the sales promotion movement, which has drawn some observers from outside the industry. It is a plan particularly applicable to an industry comprising many products of many manufacturers marketed through wholesale distributers and retailers, who, in turn, handle a diversity of products, some represented in the association, some from outside. There is none of the exclusive element which prevails in the distribution of automobiles. But there are features of the campaign which deserve the study of the automobile industry.

Adaptability of the Plan

Chief among these is the education of traveling salesmen. The automobile field employs this class of workers: territorial men for manufacturers and branch houses or distributers. Dealers generally concede that these men, particularly the factory travelers, are working along more intelligent lines than they were a few years ago. Not so many of them breeze into distributer's or dealer's office as formerly with two questions on their tongues: "How many cars are you going to take this month?" and "Where is the party to-night?" But not enough of them yet are capable of helping distributers, dealers and their sales staffs broaden their knowledge of the car they represent and the means of selling it. Not enough of them can answer a dealer's questions nor prompt him to ask questions about the reasons for the latest changes in the design of the car. Not enough of them can go down the street with the dealer and help him convince his banker of the essentiality and stability of the automobile business and his business. Not enough of them have the understanding to grasp the fundamentals of their dealers' problems and take back to the factory a story of those problems that would assist the factory in appreciating the dealer's situation and helping to make it more bearable.

The passenger car industry needs merchandising education in manufacturing and dealer establishments. It needs more origination of merchandising ideas in factory sales organizations. It needs men, possibly a re-educated set of travelers, possibly an entirely new class of men, to take these ideas to the wholesale and retail field.

Perhaps the passenger car industry can see in this work of the Automotive Equipment Association, which is trying to educate the retailer by first educating the sales representatives of the manufacturer and wholesaler, an idea which can be adapted to its own predicament. It may be an association job or possibly a job for individual manufacturers or groups of manufacturers under kindred ownership or control.

The Automotive Equipment Association is applying sales promotion not merely to equipment, commonly called accessories, but to re-equipment or replacement products and to shop equipment and tools. The entire process is educational. It is worth watching.

Marketing Costs Determined by Many Factors

An analysis of these factors, together with a close study of methods of elimination of observable waste will enable the business man to concentrate his efforts along a higher plane of efficiency. A definition of the major terms and variations covered by the single term of merchandising.

By Harry Tipper

IN the study of marketing fundamentals it is necessary to arrive at a definition of what is meant by marketing, and also what are to be observed as factors of its cost, with a definition of their meaning, so that some basis of calculation may be established.

Marketing, distributing, merchandising, selling, advertising and similar terms have acquired a more or less indefinite meaning, so that some of the factors are similar in all examinations, but the practice of definition varies to such a degree that it is impossible to lay costs side by side under any one of these headings and make a comparison which will be effective.

Items that are to be included in advertising depend upon the practice of the individual concern, and a similar condition prevails in selling.

The term merchandising, as also the term sales promotion, covers a multitude of variations in the practice and the considerations of cost.

The student of marketing who endeavors to discover the avoidable wastes and compare their cost with the total cost, finds himself hampered by the lack of any practical standards and definitions which would give him a basis of final consideration.

MARKETING costs are not hypothetical. The graveyard of business is filled with the buried remains of those organizations who have been misled by improper sales research, careless of their sales and advertising efficiency and apparently without knowledge of the factors that make up their total cost and how they can be governed.

It is possible to indicate some of the elements of analysis that should be a part of the examination of the marketing developments, and these, together with the definitions of the major terms, provide a basis for reconsideration of the marketing which will enable the business man to eliminate some of the more observable wastes and concentrate his efforts along a higher plane of efficiency. In these articles the definitions of the terms will be as follows:

1—*Marketing.* The word *marketing* will be used to designate the actions necessary to transfer the goods from the factory door to the user.

2—*Distribution.* The word *distribution* will be used to indicate the physical requirements of transportation, storage, handling, etc., connected with the physical transfer of the goods.

3—*Selling.* This term will be used to designate all those operations necessary to the transaction of securing an order by the personal contact of the salesman and buyer.

4—*Advertising.* This term will be used to denote those operations necessary to effective selling conducted with buyer of product by means of paper and ink.

5—*Sales Research*—This term will be used to denote those operations devoted to the more accurate analysis of markets, the consideration of new markets and the coördination of the product with the market; in other words, the accumulation of accurate information as to sales necessities.

Sales promotion will be dispensed with altogether. This term relates either to advertising, selling or to sales research, and does not describe a function in marketing at all.

In effect, the marketing necessities are divided into the following groups which accord with the definition of the term:

1—The goods must be actually transferred from the point of manufacture to the point of use, and this transfer represents the physical distribution.

2—The buyer of goods must be convinced of their usefulness and their application to his work. Part of this work is done by the individual method of personal selling, corresponding to the work of the individual handworker who makes the product.

3—Part of this work is done by the advertising, which makes no attempt to individualize the operation, but rather takes advantage of the economy of mass work, in order to lessen the amount of work to be done by the individual units. Selling is an individual matter; advertising is a mass operation and is really selling in the mass.

4—Sales Research represents the laboratory, where the value of the operations, the objective of the operations, the efficiency of the operations may be determined in their possibilities.

All these groups of operations function in a complementary manner.

The work of distributing and marketing the goods consists of a number of related individual operations. With the exception of the physical distribution, the actual operations themselves are concerned with more or less intangible developments, so that their values remain controversial and subject to many variables.

The whole business of selling and advertising is concerned with the intangible necessity of persuading the buyer to direct his buying to the particular product. A good many operations are necessary to complete this work, and the number of elements included in the work makes

it difficult to measure the exact value of each of the subordinate operations in their influence upon the total sale.

> What is the value of a salesman's call in the total array of operations he must go through in order to make a sale which the company can accept?
>
> How far is a salesman justified in calling upon all possible users or customers without respect to their buying power and consequently their ability to purchase?
>
> What is the minimum limitation upon the number of calls a salesman should make, as well as the maximum?

These matters all depend upon psychological averages in the final analysis, and therefore the practice of estimating them has come mostly out of traditional development and not out of the attempt to discover their relative importance. The same thing is true in advertising:

> What is the value of reaching a subscriber to a publication?
>
> What influence is exerted upon him by the character of the message?
>
> What are the limitations of reading attention and how do they affect the value of the advertising or its efficiency?
>
> Why do people observe only one or two things out of a thousand that pass the vision?
>
> How do we know in what category our advertising is to be placed?
>
> To what extent does a visible indication of interest by inquiry or other form represent the actual effect of a piece of advertising copy?

These matters again are dependent upon human reactions, and consequently they have been assumed largely because of tradition. Little attempt has been made to determine and analyze scientifically the character of the average reaction and how we may expect to meet it. One promotion letter has been known to exceed in value another promotion letter by 1000 per cent.

> What were the factors that made up this difference in efficiency and how many of them could be controlled by the writers of the letters?

These are all elements of marketing cost. Every call that is made, usually by a salesman, must be paid for. Every effort of his work that is not properly directed adds to the cost of his actual production. Every element of the office system, supporting and coördinating the sales work, that is not valuable is inefficient and must be eliminated sooner or later. Every piece of promotion matter sent through the mail that finds its way into the waste basket of the recipient adds to the total cost of effectiveness in that department. Every advertisement issued in a publication which does not interest the right people at the right time adds its cost to the sum total. Each research into marketing that is based upon insufficient statistics or improper examination of the factors not only adds its own experimental cost to the result, but may lead the sales and advertising work into unproductive and costly channels of experiment.

It is not as though these items of cost were hypothetical. The graveyard of business is filled with the buried remains of those organizations who have been misled by improper sales research, careless of their sales and advertising efficiency and apparently without knowledge of the factors that make up their total cost and how they can be governed.

Tradition has operated to produce more methods of sales organization and more methods of advertising and sales research expenditure than all the analyses of marketing put together. What the competitor is doing and what the trade has done in the past remain the first and most important questions when a new sales problem is confronted and organization budgets or changes are considered.

This is not analysis. No engineering development would have taken place on that basis alone. The past history and the competitive history is of importance only as it provides a basis for analytical consideration and improvement.

This basis cannot be secured entirely from these sources. Further research, further careful consideration of the individual factors and a careful arrangement of their cost consideration is necessary.

Even after this is done, however, the value of these motions depends very largely upon a knowledge of the principles which govern the action of the buyer and the particular reasons for the direction of his buying activity.

Furthermore, the analyst must beware of assumptions that have been accepted merely because they have become the usual practice.

Not so very long ago a friend of mine, in describing his experiences over a period of years in the deserts, referred to the fact that he had ridden about 7000 miles on camels at various times. One of his hearers asked him if he was not very sick at first, although he supposed that he got used to it. The explorer replied that the ordinary camel had a very easy motion. He did not know how the impression of sickness had arisen, except that Herodotus had spoken of it and that probably every authority since then had copied Herodotus' statement.

There are many assumptions in marketing having as little basis of fact as the effect of camel riding in this story. Those assumptions are accepted just as readily—in fact, quoted just as firmly.

So long as these traditions are included and much of the so-called analysis of the market accepted without question, marketing efficiency will increase very little and the cost of marketing will continue to increase.

In order to determine the factors of marketing cost, it is necessary that the principles of marketing be thoroughly understood. These can be discussed upon the definitions considered in this article, and further articles will enlarge upon these principles.

Eliminating Waste in Industry

A REPORT of the Committee on the Elimination of Waste in Industry of the Federated American Engineering Societies has been embodied in a book that has recently been published. This book contains a complete statement as to the aims and purposes of the committee and a description of the way in which it went about conducting the investigation.

Secretary Hoover of the Department of Commerce, in his foreword to the book, that "it contains a message for government officials, financial, industrial and commercial leaders, labor organizations, economists, engineers and research groups, the general public and the press."

In a general review of conditions the report places a high percentage of waste at the door of management and declares that the average management is much below the standards set by certain individual executives who have achieved notable success. The labor problem is also entered into thoroughly.

The book, which is entitled "Waste in Industry," is published by the McGraw-Hill Book Company, New York.

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Export Cooperation

ONE of the most significant announcements that has come before the automotive industry in recent months is that the export managers of the National Automobile Chamber of Commerce will consider, at their annual New York meeting in January, a plan for combined merchandising and sales efforts to develop our foreign trade in passenger cars and motor trucks. The fact that such a plan is even in prospect should stir the industry to a careful study of the possibilities and opportunities for enlarging, through combinations of the producing companies, the sales abroad of American-made automotive products.

The foreign trade department of the N. A. C. C., unfortunately, has not seen fit to make public the details of the proposed movement so that it might be analyzed by company executives and export managers in advance of its consideration at the annual meeting. However, it is apparent that the plan involves a grouping of various companies, under the Webb-Pomerene law, for cooperative effort in building up sales outside of the continental limits of the United States. Several forms of combinations are possible under this law and whichever one is chosen would seem to insure, at least to a majority of the companies, stronger and more intelligent foreign trade representation than they have formerly had.

The Webb-Pomerene law has been on the statute books for some years and its provisions, which permit competing companies to band together for common activities in fostering foreign trade, are fairly well known to every exporter. Numerous combinations of this sort have been organized and, according to reports, have functioned very satisfactorily to their members. Mainly, they have consisted of companies producing raw materials, such, for instance, as coal, grain, etc., but some have been for the sale of semi-manufactured or manufactured articles that are analogous to automobiles. These have been of factories producing steel and iron products, railway locomotives, textile machinery and other highly competitive lines and these combinations have been so successful as to make probable a similar success in the automotive field.

Developing Commercial Aviation

THE prospects are growing brighter for the establishment of a government Bureau of Aeronautics as provided for in the Wadsworth-Hicks bill now before Congress. President Harding in a recent note to Congress says, "I urge upon the Congress the advisability of giving heed to the recommendations of the Committee, the first and most important of which is that a bureau be established in the Department of Commerce for the regulation and development of air navigation."

This note of the President's referred to the general recommendations of the National Advisory Committee for Aeronautics which recommended a Bureau of Air Navigation similar to that proposed in the Wadsworth-Hicks bill.

The development of commercial aviation in the United States has been disappointingly small. The passage of this bill would mean a definite step in promoting its further growth and advancement. It is encouraging to have this definite favorable opinion from the chief executive.

Unit Production Costs

HARD times, with the accompanying evil of unemployment, place the employer in an advantageous position as regards dealing with his workers, when industrial relations are viewed as a matter of balance of power. In another sense, however, the employer is in a less advantageous position.

Business depression brings with it the necessity for reduced manufacturing expenses, lower prices, and, consequently, for decreased production costs per unit. The attitude of the individual worker toward his work is an important factor in bringing about lower cost per unit. Overhead expense, cost of materials, etc., affect that unit cost materially, of course, but the individual worker has it within his power to influence it considerably.

Thus the manufacturer who looked ahead during boom times, who sincerely attempted to adjust his industrial relationships fairly and intelligently has been able to cash in on those efforts during the recent business depression when he was most in need of the effective co-operation of every man working for him. A certain amount of increased efficiency has accrued to every manufacturer through fear of unemployment, but employers such as those referred to have benefited more fully. They have gained, not only the general increased efficiency, but have preserved the good-will and enthusiastic co-operation of their workers through a difficult period of necessary wage reductions. All this is a distinct manufacturing advantage at the present time and, in addition, is a sound basis upon which to rebuild an organization as business picks up.

Taxes and Industry

FURTHER revision of internal revenue laws, as suggested by President Harding in his message to Congress, warrants thorough study by the automobile industry. One of the chief stumbling blocks to the extension of the industry is the excessive taxation to which it is subjected under Federal, State and municipal laws. The principal objection is against the excise tax, which has been aptly styled a "stigma" tax. A determined effort will be made to bring about an equitable adjustment during this session. However, there are other taxes which are burdens to the trade. The new tax law, which becomes effective Jan. 1, 1922, carries an increase in the flat tax on net corporate income, making the rate 12½ per cent. At a glance this rate appears reasonable, but the attitude changes when it is considered that there is a capital-stock tax which amounts to approximately 2 per cent of the net income. The Secretary of the Treasury is not pleased with this form of assessment which he believes to be detrimental to persons engaged in productive business.

Practically every organization in the automobile trade is carried on under a corporate form and the net income in most cases is distributed in dividends. These dividends are subject to a surtax in the hands of persons receiving them. The owner of stock in an automotive corporation subject to a surtax of 10 per cent would in reality pay about 25 per cent to the Government. The flat tax on net corporate income and the capital-stock tax amounts to at least 15 per cent, and in addition there is the 10 per cent as a surtax on dividends. Larger stockholders subject to a 50 per cent tax would be taxed about 65 per cent on such profits.

Larger Diecastings

A PROGRESSIVE manufacturer of diecastings recently informed us that he expects, within a comparatively short time, to make diecast gearboxes for passenger cars. He is already making gearboxes for washing machines, castings which weigh about 11 lb. each, and considers it but a short step to make a slightly larger box, suitable at least for the smaller passenger car.

Inasmuch as most diecastings require little or no machining—that is, are practically finished when they come from the die—a possibility of this kind should not be overlooked by those manufacturers who are interested in quantity production at minimum cost.

The diecasting industry has not stood still, content with confining itself to the manufacture of small parts and fittings, but has been developing its processes until to-day it is producing thousands of parts, considered almost beyond the bounds of possibility in the diecasting field but a few years ago. There are still, of course, certain limitations, but many of these are being overcome by the use of improved diecasting machines, better alloys, more durable die material and the intelligent use of metallurgical and other research facilities. The possibilities of future development seem to be still greater than they were thought to be a few years ago.

The Underpan

THE majority of cars other than the Ford have an underpan beneath the engine and gearbox, the object of which is to protect the lower parts of these mechanisms from splashing mud. It accomplishes this object quite well, but it has so many disadvantages that it is a serious question as to whether or not it is worth while to thus protect the parts mentioned. What difference does it make, after all, whether mud cakes on the bottom of the crankcase or on the bottom of the mudpan? European engineers seem to have reached the conclusion that the disadvantages of the device overbalance its advantages and have begun to discard it.

Perhaps the greatest objection to the underpan is that it gets exceedingly dirty, even more on the upper than on the lower side. It is practically impossible to make the crankcase absolutely oil-tight, and any oil that leaks out through the bearings or joints drops into the underpan and there soon collects enough road dust to make a sticky mass which covers the whole inside bottom of the pan. If any oil is spilled in replenishing the crankcase supply it also runs into the underpan. The pan, moreover, renders the crankcase draining plug cap or cover plate less accessible and adds to the difficulty of an already irksome job. In many cases the pan lies so close to the oil pump of the crank chamber that in case any small parts, such as nuts, studs, etc., drop into it, it is almost impossible to get them out again. A greater space between the two parts is not permissible as it would inordinately reduce road clearance.

It is, of course, most desirable to protect the accessories located at the sides of the engine against splashing mud, flying stones, etc., and this can be readily accomplished by the use of either integrally cast webs between front and rear supporting arms or by filler plates of aluminum or steel sheet which fasten to the flanges of the frame side members and of the engine at the parting line of the crankcase. Such a construction makes a much neater job than that usually obtained with the underpan, and eliminates the pit into which small articles almost invariably drop when it is attempted to remove them.

Manufacturers Look to January Trade

Are on Solid Foundation Ready to Meet Keen Competition in 1922

Production of passenger automobiles and trucks in the United States for October by companies representing more than 90 per cent of the output of the industry was approximately 150,000.

The estimated total production of cars and trucks for November was 118,000.

NEW YORK, Dec. 13.—Motor vehicle manufacturers have adopted a conservative attitude, pending developments after the turn of the year, and the output for December will be the lowest of any month since the tide turned at the end of February. This is the usual seasonal condition, however, and not in any sense surprising.

Inventories Reduced

All manufacturers are preparing, however, for an upturn with the New York show the second week of January. They have gone into the market for the purchase of parts and supplies on a moderate scale so they will be prepared to meet the demands of their trade. As the year nears its end it is gratifying to note the very substantial reductions which have been made in inventories, especially by makers of passenger cars Nearly all of them have taken their losses and are in position to go ahead on a solid foundation in an era of exceedingly keen competition.

Important Announcements Expected

The slowing up in production this year has been delayed much longer than was generally expected, especially in view of the unusually large number of important announcements which are expected at the big shows. It is probable the number of new models which will be displayed for the first time at the New York exposition will establish a new record. They also will embody greater value for the money and will evidence a determination on the part of engineers to keep down maintenance costs in the way of fuel and servicing.

Reports of combinations, especially in the parts and truck fields, are becoming more definite, and announcements are expected in the near future. It is probable the next few months will bring important changes in the automotive map. One of the most important of these impending announcements relates to a plan under which some of the most important unit parts makers will group themselves together for the establishment of service stations and substations at strategic points. A second combination of this character is under way.

Predictions that November shipments would exceed those of the same month last year proved correct, and they ran over the mark by approximately 10 per cent. Another gratifying point was that they fell off less than last year in comparison with October.

Production in January probably will be expanded by new and reorganized companies which will be getting under way by that time on something of a quantity basis. Among the newcomers in the field, Durant expects to be turning out at least 200 cars a day by January 1.

FORD PLANS PURCHASE OF PLANT IN GERMANY

DETROIT, Dec. 12—A factory in Germany, for the manufacture of automobiles for German, Russian and other western European fields, is being planned by the Ford Motor Co. Charles E. Sorensen, a member of the Ford organization, left for Germany a fortnight ago. At present he is in London, following a visit to the Ford plant at Cork, Ireland. He will start for Germany within a few days, according to information here.

The present plan provides for the purchase of a large plant in Germany and conversion of it into a Ford factory. Announcement as to the size of the plant and output and number of employees is withheld at this time.

Willys-Overland Ships Two Trainloads of Cars

TOLEDO, Dec. 10—Two trains left here yesterday for Atlantic and Pacific coasts each carrying Overlands and Willys-Knight cars to dealers. The value of the shipments was placed at $1,275,000.

The shipment to the East sets the record for automobile shipments for the year. It is the largest trainload of automobiles hauled in 1921. The train consists of 100 cars and in them are 615 motor cars for New York, Boston and Philadelphia. The value of this load was $875,000 and freight charges alone amounted to $58,000.

The Western shipment contained 80 cars carrying 281 Overlands and 109 Willys-Knights valued at $400,000.

See Administration Support of Sales Tax

Attitude Taken by Mellon May Mean Broad Extension of Excise Levy

WASHINGTON, Dec. 12—Indications that the Administration is preparing to swing its support to a manufacturer's sales tax is found in the annual report of A. W. Mellon, Secretary of the Treasury, in which he outlines his views on revenue reforms for the next fiscal year.

In discussing recommendations for a reduction in the surtax rates, Mellon says:

"If this loss of revenue could not be met by rigid economy in expenditure, the revenue required could be raised either by placing a tax on certain specific articles, or by a low-rate general tax on a broad class of articles or transactions.

"Such taxes as those now imposed on automobiles and tires have been found simple and inexpensive of administration and the collection is always substantially current; they have been steadily productive of revenue and have been without injurious effect upon the country.

"In view of past experiences, a general tax either of this or like character upon a broad class of articles or transactions could be readily administered; and the rate could be made sufficiently low as not to bear unduly upon any class and at the same time produce a large amount of additional revenue."

Smoot Hopeful

If this proposal is adopted it probably will mean the elimination of the obnoxious excise taxes which the automotive industry now is paying while almost all other important industries have been exempted.

Senator Smoot, who is the foremost advocate of the sales tax, told AUTOMOTIVE INDUSTRIES to-day that until he had read Secretary Mellon's report carefully he would not venture an opinion on it. He added positively, however, that "a sales tax is coming."

"I wouldn't go so far as to say it would come at the present session, but once adopted I know it never will be dropped."

Most Easily Applied

Senator Smoot said the manufacturers' sales tax was the form most easily applied and that it would be as good as any. He does not believe the revenue raising possibilities of a sales tax should be applied for a soldier's bonus, but that when a bonus plan is adopted, as it undoubtedly will be at this session, a specific appropriation should be made by Congress to provide for it.

SHORT DRIVEAWAY MADE

NEW YORK, Dec. 12—One of the shortest driveaways on record here took place when the Poertner Motor Car Co., New York distributor, took away 50 cars from the Long Island City plant of Durant Motors.

Meyer Will Address Export Convention

Asked to Discuss Aid That War Finance Corporation Can Give Industry

NEW YORK, Dec. 12—The tentative program of the export managers' convention of the National Automobile Chamber of Commerce, to be held in New York on Jan. 10, during show week, names the speakers as Eugene Meyer, Jr., director of the War Finance Corp.; S. T. Henry of the Allied Machinery Corp., a representative of the United States Bureau of Roads; Gordan Lee, chief of the automotive division of the Bureau of Foreign and Domestic Commerce, and G. F. Bauer, secretary of the N. A. C. C. foreign trade committee. In addition, several topics of immediate importance are named for discussion by the attending export managers and factory executives.

Meyer has been asked to discuss how the War Finance Corp. can aid in financing foreign shipments of automotive products, and Henry will tell what the American exporter can do in promoting road construction in Latin-America. The representative of the Bureau of Roads will discuss governmental assistance in road building, and Lee will take up the work that the new automotive division is doing in aiding the industry in building up foreign sales.

The talk by Bauer will be the presentation of a plan for consolidation under the Webb-Pomerene law of the export activities of all N. A. C. C. members. Although the plan has not been made public, Bauer has worked out an organization that will be put up for consideration and action.

The topics to be discussed are:

What should be done to create and protect good will for American automotive products shipped abroad?

What can be done to obtain more intensive distribution of American motor vehicles in foreign countries?

What uniform practice should be followed by manufacturers with regard to requests of foreign dealers for omission of certain standard equipment?

DEALERS CONDEMN USED CAR BONUSES

NEWARK, N. J., Dec. 12—The board of trustees of the Newark Automobile Trade Association has adopted a resolution in which it asserts that the automobile business throughout the country is being harmed to a considerable extent by the practice of certain manufacturers in offering special bonuses to be used as additional discounts when trading in used cars.

The resolution states that investigation shows that these special bonuses are exerting a demoralizing influence, and as a consequence the custom is "most heartily condemned" by the association. Copies of the resolution will be sent to every motor vehicle manufacturer in the country with the request that these bonuses be discontinued so that business conditions may be more quickly stabilized.

Kraus Engine Taken Over by Fuel Oil Motors Corp.

NEW YORK, Dec. 12—The Fuel Oil Motors Corp., a New York corporation, has taken over the business of the Kraus Engine Co., which holds a controlling interest in the Kraus Auto Oil Motor Corp. This latter concern is developing the Kraus fuel oil engine for marine and similar purposes.

The principle on which the Kraus engine works is substantially as follows: In a four cylinder engine, for instance, two of the cylinders constitute an air compressor, the air from which is fed into a crude oil burner of the spraying type. The combustion chamber of this burner is of L shape and is water jacketed. At the end of the combustion chamber farthest from the fuel nozzle, water which has been preheated by the exhaust is forced into the burner and is converted into steam by admixture with the hot gases of combustion.

This mixture of steam and gases of combustion is used expansively in the two remaining cylinders. The exhaust consists mainly of steam which, of course, can be condensed. Unusual economy of operation is claimed, due to the use of a fuel selling at a very low price. The speed and power of the engine are controlled by a throttle valve in the passage from the burner to the engine inlet valves. The two power cylinders operate on the two stroke principle, every down stroke being a power stroke.

Barco Battery Changes Methods of Distribution

DETROIT, Dec. 12—Barco Battery Co. has made a complete change in its distribution methods and in the future will handle its sales through permanent district managers who replace the former factory sales representatives.

The following district managers have already been appointed: Alvan W. Dodge, Connecticut, with offices in Hartford, formerly assistant sales manager Chevrolet Motor Co. of Connecticut; George R. Flinn, New England except Connecticut, offices in Worcester, Mass., formerly with B. F. Goodrich Rubber Co.; Pierson R. Cummings, New York State, offices in New York City, formerly with Baker R. & L. Co.; C. W. Russell, New Jersey, offices in Newark, formerly with National Scale Co.; Harold W. Harwell, Pennsylvania, offices in Philadelphia, formerly with Henderson Tire Co., and Saunders & Wetmore, offices in Cleveland, Wetmore formerly being with Carbon Seal Co., Pittsburgh.

Seiberling Appoints His Sales Personnel

Chooses Former Goodyear Associates—Will Make New Tire at Portage

AKRON, Dec. 14—The complete sales personnel of the new $10,000,000 Seiberling Rubber Co. includes district managers for branches in twelve of America's largest cities. I. R. Bailey, formerly with Goodyear, is Seiberling's sales manager, and H. L. Post is assistant sales manager. All of the district managers are former Goodyear field representatives and officials.

W. A. Golden will be branch manager at Boston, Wade Aydelotte at New York, J. E. Vail at Philadelphia, H. E. Langdon at St. Louis, L. C. Gates at Chicago, J. L. Cochrun at Detroit, W. H. Ector at Dallas, R. L. Ritchie at Kansas City, W. F. Ong at Cincinnati, F. E. Argus at Los Angeles, W. T. Stanley at Minneapolis, and H. I. Walters at Atlanta, Ga. C. C. Jones will have charge of the Akron branch.

Installs New Equipment

Seiberling is transfering all fabric tire machinery from the Portage plant at Barberton to the Lehigh tire plant at New Castle, and is installing new equipment so as to build the new Seiberling cord tire exclusively at the Portage plant.

Seiberling as yet has not revealed the nature or design of his new cord tire. A statement issued by the company, however, intimates that the new tire will be something unusual and an important contribution to the automobile industry.

Seiberling, as an inventor in the early days of the tire industry, devised the first tire-building machine and demonstrated the superior uniformity and lower cost of the machine-made tire. He also introduced the cord-tire fabric adopted by practically all cord tire builders.

Announcement of the new tire is to be made about the first of the year.

Independent Motors Co. Consents to Receiver

YOUNGSTOWN, OHIO, Dec. 12—Charles G. Smyth has been appointed receiver for the Independent Motors Co. upon a petition filed by the Wilson Avenue Land Co., which has a claim for rent unpaid since August as well as a bill of $600 for work done. It was asserted in the petition that many other creditors having large unpaid bills were threatening to levy on the property.

The corporation consented to the receivership. It was stated that the company has a large number of trucks in process, but that if levies were made upon the property it would cause sharp depreciation of property value, which would not be the case if the business was kept running.

Opens Specialized Vehicle Campaign

Continental Motors Takes First Step to Overcome Any Existing Prejudice

DETROIT, Dec. 10—Pursuant to a plan agreed upon among the larger units parts makers to place cars and trucks made of specialized parts in a stronger position to compete with cars made all under one roof, Continental Motors Corp. is firing the first gun in a campaign of education in which it says:

"Specialized vehicles are composites of superior parts—designed and manufactured by organizations of specialists. They represent the best engineering and productive brains of the industry. Therefore, experienced users of motor cars and trucks purchase specialized vehicles.

"The parts embodied in specialized vehicles are the products of highly developed organizations, each one of which has concentrated all its skill and effort upon perfecting just one part. On the superiority of such parts, great organizations, working in harmony, stake their business futures.

"From specialized vehicles, backed by national parts service, buyers of cars and trucks expect maximum efficiency and economy. And they get it. They get it because specialized vehicles are qualified, part by part, to deliver the utmost in performance—qualified for instance, by such units as the power-plant that bears on its crankcase that ultimate symbol of motor-building specialization—the Continental Red Seal."

The various phases of this argument for specialized unit vehicles will be carried to the motor car buyer in turn by the other manufacturers of units who are united in the movement over their own signatures. The campaign will be carried indefinitely until the companies are assured that any possible former prejudice against the so-called assembled vehicles has been overcome.

Coupe Proves Popular in Columbus Territory

COLUMBUS, Dec. 12—With the approach of real winter weather and the holiday season, the demand for passenger cars in Columbus and central Ohio territory has slowed down materially. But this usually happens at this time of year and has been discounted by dealers and distributers generally.

Enclosed cars are still the best feature of the passenger business. Dealers are reporting many sales of enclosed jobs, including sedans, limousines and coupes. The coupe is probably the most popular body at this time, although there are a number of calls for sedans.

FINDS LITTLE KAR SOLVENT

HOUSTON, Dec. 12—A jury in District Court here has decided that the Little Motor Kar Co. was solvent at the time a receiver was appointed and that it still is solvent. In their petition to the court, the trustees of the company charged that Everett S. Owens was appointed upon the request of holders of "gratuitous stock." The trustees have applied for the lifting of the receivership and have obtained an injunction prohibiting the sale of the plant as proposed by the company.

PENNSYLVANIA FARMS USE 8,500 TRACTORS

HARRISBURG, Dec. 12—That the use of the tractor on the farms of Pennsylvania is being well maintained, is indicated by the fact that on Nov. 1, of the present year, there were approximately 8500 farm tractors in use throughout the State.

One year ago there were approximately 6800 tractors on the farms of the State. That there is plenty of sales opportunity is found in the fact that the horse still maintains its supremacy, as less than 5 per cent of the State's farms have machines.

Since the smaller tractors are being sold quite extensively in the cities for industrial purposes and as some of the larger have also been put to such use, the figures do not cover all the tractors in use in Pennsylvania.

New York Holds Back for Show Offerings

NEW YORK, Dec. 12—Though a fairly good run of pre-Christmas buying has helped to stimulate business this month, the New York passenger car market generally speaking is in its usual condition this time of year of waiting to see what is new at the shows. Most dealers have had a better first week in December than the average November week but they do not expect the month as a whole to come up to November because after the 15th or at the latest the 20th, practically no Christmas sales are made and the show is so near that it is difficult to get contracts signed.

November registrations of new cars in ten counties in and around New York as reported to dealers by Sherlock & Arnold, publishers of the *Automobile Sales Analysis*, were 2793, as compared with 3931 in October. The summary of the year to date follows:

	Approximately below $2,500	Approximately above $2,500	Total
January	483	146	629
February	1,409	210	1,619
March	3,396	488	3,884
April	4,811	575	5,382
May	5,468	584	6,052
June	6,522	495	7,017
July	5,457	386	7,017
August	4,216	350	4,566
September	4,004	331	4,335
October	3,505	426	3,931
November	2,425	368	2,793
Total to date	41,732	4,359	46,091

Eight Sales Daily Are Made in Atlanta

Other Cities in Southeast Show Same Ratio—Country Business Slack

ATLANTA, Dec. 12—Retail automobile sales in Atlanta during November, including new and used passenger cars and new and used trucks, averaged about eight per day, total sales for the month being materially less as a whole than during October. The primary demand was for low priced and medium priced cars and light trucks, mainly Ford, Dodge Brothers and Buick. Ford sales are holding up unusually well, and there is also a fair demand for enclosed cars. As a whole, conditions are much better than they were at this time a year ago, and the outlook for the coming year is many times better than it was in December, 1920.

In the larger cities of the Southeast, including such centers as Savannah, Macon, Augusta and Birmingham, passenger car and truck sales during November have been in about the same ratio as in Atlanta, but in the smaller and rural communities comparatively few sales are being made. Agricultural conditions in the Southeast are at an exceptionally low ebb and the outlook does not portend any immediate improvement.

Tractor sales are holding up fairly well, especially in industrial lines, and there is promise of improvement shortly as lumber mills of the section are expected to start up operations again in the next 30 or 60 days. As this has been virtually a closed market for the past year or more, dealers are expecting to sell many tractors to the logging interests when conditions merit resumption of operations.

G. M. Will Draft Code of Practice for Shows

DETROIT, Dec. 12—A code of practice governing the exhibition and sale of General Motors Corp. cars at the national shows and the local shows of 1922 will be drafted by the advisory board of the corporation following a meeting of sales executives of all units this week.

In the exchange of experiences valuable suggestions on the arrangement of exhibits, presentation of cars and selling helps were received. These will be embodied in the show code which will be printed and issued to all dealers and distributers.

LOCKWOOD ASKS BANKRUPTCY

KANSAS CITY, Dec. 12—John F. Lockwood has filed a petition in bankruptcy, listing obligations around $300,000, which are his endorsements on paper of the Lockwood Mfg. Co., of which he was president and which went through bankruptcy this year.

Road Engineering Syllabus Approved

Work Prepared for Use of Students in Colleges Is Submitted

WASHINGTON, Dec. 12—A tentative syllabus designed to meet the need for a short university course in highway engineering and highway transport engineering has been prepared by Prof. Lewis W. McIntyre of the University of Pittsburgh. It is not yet in final form but it is the most complete work of its kind yet prepared.

The syllabus was considered and approved by the Highway and Highway Transport Education committees headed by Dr. J. J. Tigert, United States commissioner of education, at a meeting here Friday. There are at present no text books on this subject although one is in course of preparation by Professor Blanchard of the University of Michigan.

Suggestions will be welcomed by the committee in the final outline of the syllabus which has developed an outline for a course of study with references which will permit use of all the available information on the subject. This information is being assembled by the committee and co-ordinated for the use of colleges.

The education committee made tentative plans for the holding early next year of the second national conference on highway engineering education. Reports will be made at this meeting of the substantial progress which has been made since the first convention two years ago. All groups interested in this phase of educational work will be invited to send representatives. The date for the meeting has not been determined.

H. W. Alden, vice-president of the Timken-Detroit Axle Co., met with the committee for the first time as a representative of the Society of Automotive Engineers. Alden was in charge of the Government tank program during the war.

Greene to Direct Sales of Thompson Wheels

NEW YORK, Dec. 12—W. M. Greene, New York branch manager and eastern representative of the Wire Wheel Corp., has resigned to become manager of sales for the Thompson Lattice Wheel Corp., incorporated in New York for $100,000. Six years ago Greene joined the staff of the George W. Houck Co., the original manufacturer of triple laced wire wheels in America whose interests were later absorbed by the Wire Wheel Corp. in America.

The Thompson Lattice Wheel Corp. is the name of the new selling corporation that has taken over the distribution of the Thompson lattice wheel invented by Lewis Irvine Thompson. As its name implies, the wheel is a steel structure of two conical shaped perforated discs. These two discs are fastened at the rim which is made of either the demountable or quick detachable type and are also securely fastened at the hub. This is an expanding hub which, when expanded, places the desired tension upon the lattice spokes and by means of one adjustment all of the spokes can be tightened at one operation.

Thompson is president and general manager; Charles H. Carter, vice-president, and Greene, secretary and treasurer as well as director of sales.

OXEN KEEP MORE MEN BUSY, VILLA SIGHS

DALLAS, Dec. 12—Pancho has returned to the ways of his fathers.

No longer does the automobile buzz or the tractors hum on the big ranch of Francisco Villa, former Mexican bandit.

The old mule and the one-horse plow have supplanted the big tractors in the cultivation of his acres. The ox cart has taken the place of the automobile and trucks about the big plantation.

"You see," Villa explains, "I have a large number of men following me and depending upon my big plantation for support. They depend upon me for a living, and I had to furnish them with it or they would probably organize bands and start trouble in my territory or elsewhere in Mexico.

"I found that one tractor would do the work of a dozen men on my place. Every tractor I had at work just kept eleven other men out of work. Every truck I used did the work of a half dozen ox carts, but each one left five men idle to loiter about the country and stir up strife. I have done away with them to keep my followers employed."

Bethlehem Creditors to Get Small Return

PHILADELPHIA, Dec. 9—Creditors of the Bethlehem Motors Corp., in the hands of a receiver for a year, will not receive more than twenty cents on the dollar, according to a statement by C. E. Woods, receiver, at a meeting of the creditors in Allentown. The claims total $3,000,000.

The hearing in the case before the United States District Court in this city, postponed from Dec. 7, was again postponed to-day. A decree for the sale of the property on March 15 will be entered next week. A master will be appointed to audit the receiver's account as to the validity and effect of a lien filed by the Truscon Steel Co., and as to the extent of the property.

It has been decreed that any rights of the steel company in the case are transferred to the proceeds of the sale of the Bethlehem corporation's property.

Flange Alterations Suggested to S. A. E.

Other Recommendations Made of Particular Interest to Tractor Engineers

NEW YORK, Dec. 12—Engine and carbureter manufacturers are planning a further simplification of carbureter-flange mountings by the combination of certain carbureter-flange sizes. At the present time four different nominal carbureter-flange sizes are used under 1 in.: ½, ⅜, ¾ and ⅞ in.

At the suggestion of a tractor engine manufacturer the engine division of the Standards Committee of the Society of Automotive Engineers has recommended that the flange dimensions for the ½ in. carbureter size in the present S. A. E. Recommended Practice for carbureter flanges shall be the same as the flange dimensions for the ⅝ in. carbureter size and the dimensions for the ¾ in. size the same as the dimensions for the ⅞ in. size. The adoption of these revisions in actual practice will make possible the elimination of two sizes of patterns and castings which will result in cutting production costs of these parts, especially so for carbureter manufacturers.

The revisions will be acted upon by the S. A. E. standards committee at the annual meeting on Jan. 10 in New York, and subsequently by the members of the society by letter ballot. Other recommendations which will be acted upon and which are of particular interest to tractor engineers and users are: annular ball bearings, roller-chain sprocket-cutters, flexible conduit, fan belts and pulleys, mufflers, iron and steel and non-ferrous metal specifications, lock-washers, clutch facings and tractor drawbar heights.

The recommendation as to tractor drawbar heights is an extension of the present S. A. E. standard which specifies that the height of vertically fixed drawbars on tractors of capacities up to and including four plows shall be 15 in. and of vertically adjustable drawbars on tractors of all capacities from 13 to 18 in. with the tractor on level ground.

U. S. Products President Asks for Receivership

KANSAS CITY, Dec. 14—Ragner A. Roscoe has asked for the appointment of a receiver for the U. S. Products Co., of which he is president, in a suit filed in the Jackson County Circuit Court. He alleges that the management of the company has diverted receipts and profits to personal uses and that the company is insolvent.

Roscoe states the chief asset of the company to be a contract in the sum of $36,000 with the Wharton Motors Co. of Texas, part of which has been executed and states that the contract is of reduced value because of the inability to make collections.

Withholds Financing of Export Shipments

War Finance Corp. Not Sold on Essentiality of Automotive Industry

WASHINGTON, Dec. 12—The War Finance Corp. has decided definitely not to finance at this time foreign shipments of automotive vehicles and equipment. No statement has been made covering the grounds for this decision and none is expected for it is not the policy of the corporation to explain in detail its decisions.

It is generally believed, however, that the officers of the corporation have not been "sold" on the essentiality of the industry and its importance in the industrial life of the United States. They apparently have absorbed the idea that automobiles are luxuries and no concerted effort has been made to make clear to them the fact that the automotive industry ranks second in importance only to iron and steel.

The automotive trade division of the Bureau of Foreign and Domestic Commerce will seek the co-ordinated co-operation of the industry to reopen the case and present to the War Finance Corp. the importance to the country of fostering exports and thereby taking up the slack in production which spells the difference between prosperity and the reverse.

Asks Premier Receivership to Speed Reorganization

INDIANAPOLIS, Dec. 12—A petition asking for a receiver for the Premier Motor Corp. has been filed here by Hiram A. Whitman, a stockholder of the corporation who holds promissory notes of the company aggregating $4,000. Quincey A. Myers, attorney for Whitman, asserts that the petition was filed to hasten the reorganization which is now under way. I. E. Schaeffer, secretary and treasurer of the corporation, agrees with this statement.

It is claimed that the assets of the corporation are $2,000,000 in excess of liabilities. A hearing on the receivership petition has been set for Dec. 19.

Patent Office Conditions Are Set Forth in Report

WASHINGTON, Dec. 13—The report of the commissioner of patents for the fiscal year ended June 30, 1921, sets forth plainly the lamentable conditions prevailing in that office arising from the congestion of applications and the insufficient number of examiners.

Enormous losses of capital result from the holding up of applications for patents which it is necessary to have acted upon before inventions can be financed. Business interests of the country are strongly urging Congress to pass pending legislation increasing the number and salaries of technical men in the patent office and to induce those now employed to remain.

The patent office lost 163 examiners, scientifically trained and members of the bar, from July, 1919, to June 30, 1921, it is pointed out, and these were replaced by inexperienced men, fresh from college, without any knowledge of patent laws or legal training. In the same period, the number of applications for patents increased 34 per cent, while applications for trademarks increased 85½ per cent. At the end of the fiscal year there were approximately 50,000 patent applications awaiting action, as compared with 18,000 in July, 1919.

Engines in New Oakland Model 34D Guaranteed

PONTIAC, Dec. 12—The Oakland Motor Car Co. has announced that it will guarantee the motors in its new 34D models against what is known as "oil pumping" for 15,000 miles, or over a period not exceeding two years. This special written guarantee will be given by every Oakland dealer. The main provisions of the guarantee is contained in the following paragraph:

"Should the engine of this car fail to perform properly due to the presence of excess oil in the combustion chamber (commonly known as 'oil pumping' and evidenced by oil on the sparks), the Oakland dealer who delivered this car to you will remedy the cause of the trouble without cost to you of either material or labor."

To Redesign Line

DETROIT, Dec. 12—The Oakland line of General Motors will be redesigned along the lines of the sport model recently introduced which has proven to be the popular member of the Oakland family and mainly responsible for that company's continued high production. New models in all Oaklands will be shown at the New York show, all displaying the sport features, and these will be the only new models exhibited by any General Motors unit. A production mark of 18,000 Oaklands has been set for the first eight months of 1922.

GEAR RECEIVER NAMED

BOSTON, Dec. 13—A receiver has been appointed for the Crofoot Gear Works, Inc. An inventory of the property is being taken and as soon as it is completed a report will be filed showing the condition of the corporation. An effort will be made to liquidate the company at the lowest possible expense. Creditors holding a majority of the unsecured claims have signified their approval of the appointment of George E. Howe as receiver.

BATTERY DEALERS ORGANIZE

DETROIT, Dec. 10—A battery chapter of the Michigan Automotive Trade Association was organized here this week with about twenty battery dealers and distributors signing as charter members.

Body Company Buys Old Moore Factory

United Automotive Consolidates With L. C. Graves Co. and Locates at Danville

DANVILLE, ILL., Dec. 12—The United Automotive Body Co., which has been consolidated with the L. C. Graves Co. of Springboro, Pa., manufacturer of commercial car and truck bodies, has purchased the plant of the defunct Moore Motor Vehicle Co. in this city and will operate it under the name of the United Automotive Body Co.

The Cleveland offices of the United Automotive Body Co. have been closed and offices established here. The personnel of the Ohio corporation has been retained. F. O. Darling continues as general manager, W. R. House will be manager of the branches, W. H. Paul will continue as manager of the Lansing assembly plant and E. W. Windsor will be sales production manager. A. H. Palm, secretary of the L. C. Graves Co., will be secretary of the new corporation and will supervise the accounting. Other men in the organization are C. E. Rupe, formerly general manager of the Champion Wagon and Waterloo Body companies, will serve as factory manager, and John Fixott, formerly with Traffic Truck Co. as special bus representative.

The United Automotive Body Co. has branches at Detroit, Lansing, Toledo and Youngstown. It is expected that operations in the Danville plant will be started within 60 days.

A bulletin sent out by the new corporation states that it is proposed to merge with it many other body builders and that no less than 30 already have signified their interest in the project.

British Company Joins with Champion Ignition

LONDON, Dec. 2 (*By Mail*)—The Champion Ignition Co. of Flint, Mich., maker of "AC" plugs, whose British interests have hitherto been in the hands of the AC Sparking Plug Co., London, has joined forces with the British Sphinx Plug Co., well known Birmingham manufacturer of mica and porcelain plugs since 1904.

It is intended to continue the manufacture of Sphinx plugs conjointly with the production of British-made "AC" plugs. The British-made "AC" plugs will incorporate all features of the American plugs including electric welding of the side electrodes to the body of the plug and of the central nickel electrode to the screwed terminal and electric sealing of the insulator in the metal body.

TAKES OVER BOLLSTROM PLANT

DETROIT, Dec. 12—The Ruggles Motor Truck Co. has arranged to take over the plant of the former Bollstrom Motors, Inc., at St. Louis, Mich.

Trend Moves Toward Exclusive Handling

Manufacturers Desiring Such Representation of Products Are Rounding Out Lines

DETROIT, Dec. 12—Insistence on exclusive representation by many of the leading companies of the industry is mainly responsible for many of the new models slated for introduction at the national shows. Makers who have been known for years as the manufacturers of heavy and medium priced cars are bringing out light and lower priced cars intended to round out their lines and give their dealers complete lines from the one company.

Some of the older companies, Dodge Brothers, notably, came out some time ago for exclusive representation on the part of their dealers. The theory of exclusiveness has been adopted by other manufacturers and considerable competition has developed to retain the substantial dealerships.

Some Retain One Model

A few manufacturers are carrying through on the one model basis. Ford, Dodge Brothers and Lincoln are in this class, as are Hupp, Reo, Earl and Dort. Rickenbacker Motors is starting out in the one price class. General Motors with its line of Chevrolet, Oakland, Buick, Oldsmobile and Cadillac contains a varied assortment of models and prices.

Nash and Studebaker have lines corresponding closely to the Buick and Oldsmobile assortment embracing fours, sixes and big sixes. Others in the four and six field in the Detroit district but operating as separate entities are Hudson and Essex and Maxwell and Chalmers. Chandler and Cleveland have been operating in the big six and little six field as has Columbia, and to this field is now being added the Jewett by Paige, the Hanson and perhaps Liberty.

Movement Progresses Quietly

The movement to bring about exclusive representation of companies has been proceeding quietly but nevertheless it has been proceeding and 1922 will see more progress in this direction than the industry has known before. The theory back of the movement is that cars are being bought to-day mainly on a dealer personality basis and an owner switching to a higher priced vehicle will buy from the dealer who sold him a satisfactory low priced car.

Continental to Produce Two New Lines of Engines

DETROIT, Dec. 10—Continental Motors Corp. is about to start production on two new distinct lines of engines, a light six to be known as model 6-Y which is designed to enable manufacturers who have been building big sixes exclusively to build a smaller vehicle rounding out their line, and a special bus model for vehicles of 4½ to 5½ tons, which will be known as model 4-L.

Manufacturers using the light six engine will build it into cars selling at about $1,000 to $1,200 and it is expected that cars thus equipped will be seen at most of the shows of the 1922 season. With the light six the Continental passenger line will now include the light, medium and big six in addition to its special models manufactured for special factory designs.

The bus model is especially designed to meet speed requirements and lubrication facility. The truck models made by the company are also undergoing revision along lines permitting of greater speed.

Greater Tractor Sales Reported in Southeast

ATLANTA Dec. 14—Tractor sales in the Southeast during October and November were materially better than the same two months in 1920, according to factory branch managers in the Atlanta territory.

In east Tennessee sales have been unusually good all summer because of the fact that agriculture is more diversified in that section than anywhere else in the Southeast, and the farmers therefore are more prosperous. In Georgia and North Carolina industrial sales have been unusually good as these two States lead the Southeast in road construction work now in progress.

Thousands of acres of swamp lands in Florida are being reclaimed this year, and tractors are being largely purchased for this work in the southern part of the State. Alabama sales have increased materially the past two months due to the fact that crop diversification was more widely practiced in that State this year than ever before.

South Carolina is the only State of the section where sales are far below normal because of poor cotton and tobacco crops this year. The outlook for winter business is many times better than it was at this time last year.

Substitute Complaint Filed in Rockwell Suit

HARTFORD, CONN., Dec. 14—Permission to file a substitute complaint has been granted by Judge Avery in the Superior Court in the suit of Albert F. Rockwell against the New Departure Mfg. Co., the company's counsel, John T. Robinson, having a notation made that a pending counter claim of $30,000 for over payments to Rockwell shall stand.

In his original action, Rockwell sued for $2,000,000 damages, asking for reformation of his contract with the company for the reconveyance of certain patents to him, the issuance of an injunction restraining the company from using certain patents, and seeking damages for being deposed as president of the company.

Hercules to Enter Motor Car Field

Will Produce "McCurdy", 6-Cylinder Automobile, Early in New Year

INDIANAPOLIS, Dec. 14—The Hercules Corp. of Evansville will enter the motor car production field early in 1922 with the "McCurdy," a 6-cylinder car with standard parts and a wheelbase of about 126 in. It is not likely that the car will be ready for the automobile shows, but it is confidently hoped that it will be in readiness for spring delivery.

Well Financed

The Hercules corporation, which will launch the car without going outside its organization to finance it, has long been known as one of the largest industrial establishments in its line, that of the making of buggies and carriages, gasoline engines and bodies for trucks and commercial cars. It started 31 years ago in Cincinnati, but moved to Evansville about 20 years ago, and has advanced to the position of one of the largest industrial establishments in Indiana.

It has a record of having produced in one wear 84,000 buggies and carriages, 62,000 gas engines and 40,000 bodies for trucks and commercial cars. Its factories cover 31 acres and its sales organization is represented in every part of the country and in Canada, Mexico, Central and South America, and Europe. Last year's sales are said to have exceeded $12,000,000.

Evolved from "Gale"

Col. W. H. McCurdy, head of the corporation; J. D. Crafts, general manager; Lynn McCurdy, son of Colonel McCurdy and vice-president of the concern; and Gard Gale, sales manager, have spent a year in the development of the "McCurdy," which has been evolved from the "Gale," a car designed by Garde Gale and exhibited at the 1920 March Indianapolis Automobile Show. Both Gale and Lynn McCurdy have long been identified with the automobile industry, McCurdy having served as head of a motor transport division during the war. Detailed announcement of the specifications of the car is not yet ready.

Apperson Branch Replaces Distributor in St. Louis

ST. LOUIS, Dec. 12—In keeping with its policy of establishing factory branches in principal cities throughout the country, the Apperson Bros. Automobile Co. has purchased outright the assets and liabilities of the Apperson-St. Louis Motors Co., former distributor of Apperson cars in St. Louis.

The branch will retain the name and premises of the former company and L. F. Jalageas will be manager.

St. Louis Discusses Chicago Air Service

Plans for Reopening of Route Made at S. A. E. Meeting

ST. LOUIS, Dec. 12—The restoration of the airplane mail service between St. Louis and Chicago, which was abandoned July 1, 1921, because of lack of funds, was planned at the first meeting of the Society of Automotive Engineers ever held in St. Louis, which took place at the Claridge Hotel last night.

All the speakers touched on the future of the airplane, the principal speaker being Col. J. G. Vincent of Detroit, vice-president of the Packard Motor Car Co., past president of the S. A. E. and one of the designers of the Liberty motor for war airplanes.

Postmaster Colin M. Selph said that he had a conference with Representative L. C. Dyer before the latter departed for Washington, in which the congressman stated he would introduce a bill for the reestablishment of the St. Louis-Chicago air mail service as soon as possible.

The meeting pledged its co-operation in urging the passage of the bill and in improving the landing field in Forest Park to permit the use of large airplanes capable of carrying more than the 150 lb. of mail which was the limit of the previous airplanes. Colonel Vincent expressed approval of the plan and declared that the air mail service would form a great nucleus about which the development of the airplane would center.

Colonel Vincent showed motion pictures of flying scenes at several leading fields and explained recent improvements such as the reversing of the propeller and the action of the airplane parachute.

The St. Louis Automobile Manufacturers and Dealers Association joined with the society in promoting the meeting. George P. Dorris, president of the Dorris Motor Car Co. and Western representative of the S. A. E., presided.

To Get Export Data by Questionnaires

WASHINGTON, Dec. 12—The export committee of the National Automobile Chamber of Commerce has agreed to bear the expense of obtaining from greatest foreign potential trade centers definite information concerning the possibilities for the sale of American automotive products. The work will be done through the automotive trade division of the Bureau of Foreign and Domestic Commerce.

The plan as outlined contemplates obtaining the services of reliable men who will answer by cable once a month a questionnaire which will be sent to them. The information contained in these replies will be anaylzed and tabulated here. It then will be supplied to the entire industry. Although the N. A. C. C. will bear the expense, the information will not be for the exclusive benefit of its members.

The automotive division of the bureau is preparing to send to all automotive manufacturers a questionnaire which will give detailed information on their exporting practices. The individual replies will be held strictly confidential, but the general results will be analyzed carefully and made available to the entire industry.

WALLIS TRACTOR WINS IN PLOWING CONTEST

RACINE, Dec. 12—The fourteenth annual plowing contest under the auspices of the Pilot-Rock Association in Cherokee County, Iowa, was won by J. E. Bushlow driving his own Wallis tractor and pulling a genuine J. I. Case three bottom plow. He also won the first prize last year with the same outfit. The second prize in this class was won by a Twin City tractor, while the third and fourth prizes were taken with Wallis tractors.

Employment in Industry Increased 2.7 Per Cent

WASHINGTON, Dec. 14—Increased activity in the automobile industry was the one bright spot of the industrial situation for November, according to an analysis of reports received from special agents of the United States Employment Service, Department of Labor, from 1428 firms usually employing 501 or more, located in 65 principal industrial centers of the country.

The data show that employment increased in the industry 2.7 per cent in November, as compared with the previous month, the actual increase from the firms reporting to the Government amounting to 4531 workers.

Reports from 70 automobile firms in Detroit show that 4398 workers were recently added to their forces, bringing the total employed up to 115,802. Half of this number are working on part-time schedules.

In Dayton, automobile industries are working on a conservative basis. The report shows that part-time employment in Toledo is more prevalent in the automobile industry and accessories. There is the usual seasonal falling off in the parts and accessories industry in Milwaukee.

CHARGE RIVER ENCROACHMENT

ROCKFORD, ILL., Dec. 12—The Cotta Gear Co. and Charles Cotta, manager, have been indicted by the Federal grand jury in Freeport for encroachment upon the Rock River. It is the first indictment of its kind ever returned against a Rockford firm.

Goodyear President Visiting Argentina

Will Conduct Survey of Tire Trade Conditions in South America

AKRON, Dec. 14—E. G. Wilmer, president of the Goodyear Tire & Rubber Co., has left for South America, where he expects to conduct an extensive survey of tire trade conditions, especially in Argentina, the central South American distributing point for Goodyear tires. Wilmer will also inspect Brazilian property acquired some time ago by Goodyear for the erection of a South American tire building factory.

During Wilmer's protracted absence, affairs at Goodyear will be in the hands of H. A. Springford, who has been elevated from the position of treasurer to that of special assistant to the president. P. H. Hart, assistant treasurer and formerly with Price, Waterhouse & Co., in charge of the Goodyear audit prior to the company's reorganization last May, has been elected treasurer.

Personnel changes made to fill vacancies created by the resignation of many Goodyear veterans who have joined F. A. Seiberling in his new rubber company, have been announced by Sales Manager L. C. Rockhill. H. J. Thompson succeeds H. L. Post as manager of the sole and heel sales. K. W. Wolcott is made assistant to Thompson. H. P. Post becomes assistant manager of the mechanical goods department, succeeding C. A. Jones. F. W. McConkey succeeds H. I. Walters as southern division manager of tire sales and D. O. Kinney succeeds L. C. Gates as manager of motorcycle tire sales. T. J. Moorse assumes the editorship of *The Triangle*, the Goodyear salesmen's bulletin, succeeding H. A. King, now director of sales personnel for Seiberling.

Arthur Spore, formerly with Goodyear, returns as assistant advertising manager, succeeding Frank Griffin, now advertising manager of the new Seiberling company.

Policy for Membership in N. A. D. A. Changed

ST. LOUIS, Dec. 12—Future membership in the National Automobile Dealers Association will be limited to those merchants who have been in business two years, who have first-class credit and financial rating and who carry not only the endorsement of their fellow dealers, but the confidence of their buyers.

Membership dues in the organization are to be changed from the payment of $10 per year to a grade of classification of $50 per annum as the lowest dues and $250 as the highest. The new regulations are effective Jan. 1, 1922.

"The change is made to meet the economic condition" is the statement issued by the association and signed by the board of directors.

Willys Receivers Hold Conferences

Inventory of Assets Likely to Be First Step in Their Administration

NEW YORK, Dec. 14—C. O. Miniger, president of the Electric Auto-Lite Corp. of Toledo, who is receiver for the property of the Willys Corp. in Ohio, New Jersey and New York, arrived here yesterday for conferences with Colonel Francis G. Caffey and Clifford I. Voorhees, who are his co-receivers in the southern district of New York and in New Jersey.

Details of procedure in each district will be worked out while he is here. It is probable the first step will be to take a careful inventory of all the assets. Inasmuch as the productive units of the corporation usually would be closed about this time for inventory taking, no hardships will be involved by this process. The most important of these units are the Electric Auto-Lite and the New Process Gear Corp. at Syracuse.

To Continue Operations

After the inventory, operations in these plants will be continued virtually as before the receivership, although all possible economies will be instituted. The next step probably will be an attempt to sell the Chrysler plant at Elizabeth, which is the cause of all the corporation's financial difficulties. So far as can be learned no negotiations for the purchase of this property are pending.

No steps looking to a reorganization and possible refinancing have been initiated thus far and it is probable several weeks will elapse before anything definite is done along this line.

Miniger was reappointed a co-receiver of the New Jersey property yesterday by Federal Judge Bodine, who removed him two weeks ago upon the petition of bank creditors who have since then agreed to co-operate fully in the receivership.

Other Courts Act

Miniger and F. P. Kennison, one of the receivers for the Ohio property, and Mayor George R. Lunn of Schenectady have been appointed by Federal Judge Cooper receivers for the holdings of the corporation in the northern district of New York. This includes the New Process Gear plant.

An order signed by Federal Judge Knox in the southern district of New York removed Kennison in this district and left Miniger and Caffey as receivers.

Federal Judge Killits ppointed Colonel Caffey receiver to work with Miniger and Kennison in the Ohio district. Mayor Lunn visited Toledo the early part of the week and conferred with Kennison on plans for reorganization.

Notwithstanding opposition by attorneys for the corporation, Federal Judge Morris, sitting at Wilmington, appointed Robert H. Richards, former attorney general of Delaware, as receiver in that State. Only one receiver was named and it is possible Miniger may be appointed to serve with him unless it is decided to lift the receivership in that State.

A receivership petition was filed in Delaware by the bank interests before the signing of the "treaty of peace" last week. The action was taken upon the ground that inasmuch as the Willys Corp. is incorporated under the laws of Delaware, receivers named in that State should take charge of all its assets wherever they may be located.

Oppose Delaware Motion

In opposing the Delaware application, attorneys for the company took the ground that there are no tangible assets in that State and that all assets of the corporation are already in the custody of the receivers. Judge Morris held that under the laws of Delaware, as interpreted in a long line of decisions, no course was open to him except to appoint a receiver. He fixed the bond of Richards at $20,000.

Robert A. Thatch, of counsel for the corporation, in arguing that there was no necessity for a Delaware receiver inasmuch as there were no assets in that State, pointed out that two alternatives faced the defendant. One of them is a successful plan of reorganization and the other the winding up of its affairs. If the latter course became necessary he believed it possible there would be a residue which would come into the hands of the Delaware courts for distribution. It also was stated that inasmuch as all interested would profit by continuing the business, the bank creditors would be willing to defer the appointment of a Delaware receiver.

Judge Morris held, however, that he had no option but to appoint a receiver.

FORD PRODUCTION WILL SURPASS 1920

DETROIT, Dec. 14—The Ford Motor Co. will continue operations on its four days a week schedule up to Dec. 21, when it will close for inventory and will remain closed until shortly after Jan. 1. Completion of its year's schedule will show a slight increase over 1920, which totaled 1,023,552. Indications for 1922 business are regarded as highly favorable by executives, and production will resume after the inventory, taking on at least as heavy a schedule as marked the closing of 1921.

SUES FOR BODY RECEIVER

INDIANAPOLIS, Dec. 14—Suit for a receivership for the Indianapolis Body Corp. was filed in Superior Court here by Peter M. King, who asks judgment for $10,000 alleging that a balance of $3,563 on five notes is due him.

Oregon Completes Study of Road Cost

$3,000 Necessary to Maintain One Mile of Pavement for Year

PORTLAND, ORE., Dec. 14—Figures relative to cost of maintenance of highways in the State of Oregon were issued here to-day by Herbert Nunn, State highway engineer, who recently completed an exhaustive study of the subject to secure data upon which to base a law regulating for-hire truck and bus operation, and the subject is now demanding the keen interest of automobile and truck men throughout the entire State.

Cost to the public of Oregon for maintaining one mile of pavement for one year is $3,000, while the cost of maintaining a mile of macadam is $1,675, according to Nunn's report. The cost for each vehicle mile is given as 0.01 cent for pavement and 0.015 cent for macadam. For trucks, each ton mile on pavement costs the public 0.01 cent, and on macadam 0.015 cent. The cost per passenger mile is figured at 0.002 cent.

The figures take into consideration all kinds of depreciation, Nunn explained, not only to the pavement itself, but to the grade, cuts, fills, drainage, and interest charges on road bonds.

What the new regulations governing for-hire trucks and buses will be cannot yet be foretold, but it is said the truck men offer no obection to the present regulation limiting the total load to 22,000 lb. nor to the present speed regulations. A system of insurance for passengers and for granting licenses to bus lines on the basis of continuous and satisfactory service, eliminating the fly-by-night driver, are considered sure of incorporation in the new law.

South African Demand for New Cars Improves

NEW YORK, Dec. 12—Automotive conditions in South Africa are summed up as follows in the current business review of the National Bank of South Africa:

"The tendency of the market for new cars is toward a decided improvement. The country districts are displaying more interest, and it is stated that a fair number of sales has been effected. The used car market is not so good."

The review was written at Pretoria, on Sept. 30, before the present upward movement began in sterling exchange, which has brought that currency upward to its quotation to-day of slightly less than $4.15, at which rate it is less than 15 per cent below par. The South African bank statement adds to the foregoing that reports from Johannesburg are "optimistic in tone, and better conditions are looked for even during the remainder of the year."

Waste Elimination Movement Started

Secretary Hoover Creates Division —Automobile Manufacturers to Meet with Him

WASHINGTON, Dec. 14—In an effort to co-ordinate and forward the movement for the elimination of waste in the automobile industry, a meeting of automobile manufacturers may be called within a few days under the general direction of the Department of Commerce for the purpose of instituting a variety survey and other studies necessary for eliminating excess sizes and varieties.

A division has been established in the Department of Commerce by Secretary of Commerce Hoover for the purpose of assisting industry to decrease sales resistance and obtain better service through the possible elimination of any duplication of parts where questions of dimension, not of style, are at issue. It is expected that in the event this program is carried out it will assist in reducing the production costs of passenger cars, trucks and tractors.

Durgin in Charge

Secretary Hoover has placed William A. Durgin, for several years public utility expert for the Commonwealth Edison Co., Chicago, in charge of this activity. Mr. Hoover has made it clear that the department's policy in this matter is almost a complete reversal of governmental policies, for, instead of ordering industry to put into effect certain reforms, the department is asking business what the Government can do to help it in its problems.

The Secretary describes the movement briefly as follows:

"There is a great area of waste in American industry that can only find correction at the hands of the manufacturers, and can only find it in a purely voluntary action on their part."

No Compulsory Methods

In other words, Mr. Hoover insists that the simplification proposals must be inspired by the manufacturers themselves, as it is not the desire of the Department of Commerce to enter into any compulsory methods. In this connection, he says:

"I do not believe that the impulse and progress of American industry can come from Government legislation or interference; but there are occasions, I think, when the friendly help of the Government can furnish a center point for the communication and discussion of manufacturing groups and those professions and trades with which they must also come to some conclusion have been well selected."

The movement indorsed by the Department of Commerce covers such questions as nomenclature, dimension, simplification, and variety, without interference with style. Suggestions for simplification have been submitted to the department but their consideration will be postponed until a conference is called between representatives of the automobile industry and the Government. These proposals involve tire dimensions, dimensions of starting and storage batteries, sizes of seats, steering wheels, etc.

If a survey is undertaken by the industry, it will cover cost of car and service to owner and other details which are necessary for the information of a conference. The department will undoubtedly ask the assistance of the Society of Automotive Engineers and use the handbooks of the society.

As an instance of simplification, it is stated that tractor seats can be reduced from 9 sizes to 3, owing to slight differences in width. It is also stated that the survey will deal more particularly with sizes rather than with the number of parts.

(*Continued on next page*)

AUTOMOBILE INDUSTRY IS FIRST IN BUFFALO

BUFFALO, Dec. 12—Automobiles, bodies and parts now lead Buffalo industries.

This is shown in the Yearbook of Buffalo, containing the 1920 industrial census of the Buffalo-Niagara industrial zone, which is now being prepared for publication.

The report shows that for the first time the automobile industry has replaced flour and grist mill products and slaughtering and meat packing as the leading industry in the city. These two now run second and third.

Secretary Denby to Speak at N. A. C. C. Dinner

NEW YORK, Dec. 14—Secretary of the Navy Denby, who formerly was one of the principal owners of the Denby Motor Truck Co., will be the guest of honor at the annual dinner of the National Automobile Chamber of Commerce which will be held at the Commodore Tuesday evening, Jan. 10. The only other speaker of the evening will be Irvin S. Cobb, the celebrated humorist. Colonel Charles Clifton, president of the N. A. C. C., will preside as toastmaster.

The arrangements for the dinner are in charge of a committee of which Pierre S. duPont, president of the General Motors Corp., is chairman. Associated with him are A. R. Erskine, Alvin Macauley, David S. Ludlum, William Robert Wilson, W. C. Marmon and A. G. Seiberling.

Aero Club to Dine

NEW YORK, Dec. 14—The annual banquet of the Aero Club of America will be held at the Hotel Commodore Monday evening, Jan. 9. The dinner will be for members of the Aero Club of America and affiliated aero clubs, the Society of Automotive Engineers, the Automobile Club of America, the Automobile Club of New York and others.

N. A. C. C. Suggests Contract Changes

Provision Made for Protection of Dealers in Event of Cancellation

NEW YORK, Dec. 14—Directors of the National Automobile Chamber of Commerce have transmitted to automobile manufacturers certain suggestions for contract changes which the dealers, represented by a special committee of the National Dealers Association, believe will prove mutually beneficial in the distribution of motor cars. While these changes are suggestions only, the directors of the N. A. C. C. believe they are proper ones for consideration by those engaged in the manufacture and distribution of motor vehicles.

Maker Must Repurchase

The most important suggestion is that when a contract is cancelled or terminated by the manufacturer, he obligates himself to repurchase at the net price originally charged the stock of the new cars and regular models and such parts as were originally purchased from him which may remain in the hands of the distributor at the date of cancellation. The text of the suggestions follows:

The distributor must furnish to the manufacturer an order for motor vehicles for the period of 12 months in advance for distribution in his territory, covering the allotment of models by months. The manufacturer may ship motor vehicles according to such statement unless the distributor shall notify the manufacturer from 60 to 90 days in advance of a change in the shipping schedule for any month or months. By the giving of such notice, unfilled shipments may be automatically cancelled, provided, however, that every distributor must, during each quarter of the contract year, take at least 50 per cent of his aggregate order for such quarter.

If, for any reason, the manufacturer does not ship during any month the orders specified for that month, such unshipped orders for that month may be automatically cancelled by the manufacturer and be deducted from the allotment to the distributor as specified for that month and in such case the manufacturer and distributor will be released from any further liability for such month on such unfilled order.

Excess Orders Optional

Any orders submitted by the distributor in excess of the monthly allotment as above provided may be accepted by the manufacturer at his option and when so accepted shall be deemed to be subject to all the conditions to which motor vehicles ordered by annual allotment are subject.

This agreement shall remain in force and effect until cancelled or terminated with or without cause by the giving of notice by either party to the other party in writing of 15 to 30 days and at the end of the time specified in such notice, this agreement shall be deemed to be in all respects cancelled and terminated.

In the event of a cancellation or termination of this agreement such cancellation or termination shall be the act of a corporate officer,

(*Continued on next page*)

New Zealand Imports Decline During Year

Industry Feels Effects of Efforts to Equalize Balance of Trade

LOS ANGELES, Dec. 12—A radical break in imports during the closing months of the period greatly cut into the total imports of motor vehicles by New Zealand during the first nine months of 1921, as compared with the first nine months of 1920. There were 3560 motor vehicles valued at £1,100,363 in the first nine months of 1921, as compared with 8479 cars valued at $1,930,893 in the same period in 1920.

Automobiles suffered with all other lines of merchandise in the campaign waged by the banks and the Government authorities to curtail imports in order to bring about a more equalized balance of trade. Business conditions are rapidly improving in New Zealand, and this market, long noted for its great purchasing strength, will soon be resuming its imports of American automobiles on a healthy scale, providing British manufacturers do not succeed in their efforts to have the preferential rate of duty increased and the general duty increased.

Fire Damages Templar Plant; Loss, $250,000

CLEVELAND, Dec. 14—Fire that swept the Templar Motors Co. property at Lakewood, for three hours last night, destroyed property valued roughly by M. F. Bramley, head of Templar, at between $250,000 and $300,000.

The main fireproof plant of the Templar property was the only structure that remained untouched by the rain of sparks. The old main plant, a frame structure composed of three buildings, which was built four years ago and in which the parts used for building cars were stored, was completely burned down and about 30 automobiles were lost.

Besides this, he said, about 300 new windshields were lost. He estimated that there was about $75,000 worth of service stock alone stored in the building. Firemen report the cause of the fire is unknown. President Bramley announced the entire plant will be closed all day to-day. After to-day, however, he said work will go on as usual.

TO AID FOREIGN TRADE

NEW YORK, Dec. 15—The directors of the Motor and Accessory Manufacturers Association have decided to appoint a foreign trade committee of five to act "as the co-ordinating clearing house and point of contact between the Government officials and the members of the association in carrying out the foreign trade program" of the Bureau of Foreign and Domestic Commerce. The president will select the chairman of the committee who will name his associates.

PRODUCTION FOR 1921 *WILL TOTAL* 1,700,000

NEW YORK, Dec. 15—Careful estimates of the total production of motor vehicles by American companies for 1921 indicate that the final figure will approximate 1,700,000. This will include the foreign assembling of cars by Ford and other American companies which have assembly plants in other countries.

Domestic production will aggregate 1,604,000. The domestic production for the first nine months of the year aggregated 1,200,000. The estimated domestic production for the last quarter with figures for October and November practically complete is 403,000. In all instances the figures include both passenger cars and trucks.

The total production for 1920 was 2,205,000 so that the output for this year will be only approximately half a million less than in 1920. The most optimistic estimates made at the beginning of 1921 did not exceed 1,500,000.

N. A. C. C. Suggests Contract Changes

(*Continued from preceding page*)

sales manager or other person duly authorized to cancel or terminate sales agreements.

It is agreed that in the event of the cancellation or the termination of this agreement by the manufacturer, said manufacturer obligates himself to repurchase at the net prices originally charged to the distributor, the distributor's stock of new saleable cars of regular models of the current serial year shipped by the manufacturer within six months before, and such parts as were originally purchased by the distributor from the manufacturer, which car or parts are in the hands of the distributor at the date of said cancellation by the manufacturer

In the event of the cancellation of this agreement by the distributor, the manufacturer at his option may purchase such stock of new motor vehicles or parts, sold by him to said distributor, and on hand at the date of the cancellation or termination of this agrement by said distributor.

It is agreed that the distributor shall furnish the manufacturer semi-annually in each contract year an inventory of parts on hand and shall return such parts to the manufacturer as may comprise an over-stock in the hands of the distributor or which the manufacturer has declared to be obsolete.

The suggestions above apply also from the distributor to the dealer.

TO PRODUCE DURANT SIX JAN. 15

NEW YORK, Dec. 15—It is expected that the Durant Motor Car Co. of Indiana will begin production of the new Durant six about Jan. 15. Production of the Durant four already has begun on a small scale at the Lansing plant and the Durant Motor Car Co. of Michigan proposes to turn out about 500 cars before the end of the year.

Waste Elimination Movement Started

Hoover Forms New Division—Automobile Manufacturers to Confer With Him

(*Continued from preceding page*)

As to the general purpose of these proposals, Secretary Hoover says:

"We are in a broad sense, confronted with a great many economic difficulties—the necessity to maintain a high wage level, the consequent necessity to reduce all processes of manufacture to the lowest possible costs, and under the compulsion of eliminating every possible waste of industry itself.

"There is one thing that stands out about American industry that comes up daily to the Department, and that is the remarkable efficiency of the individual industry and the very considerable inefficiency of collective industry. If we had the same native efficiency collectively in this country that we have individually, we would have no difficulty in maintaining our own in foreign or international commerce, and of maintaining the high wage levels and the high standards of living. It is only by virture of some prompt action that we can hope to secure some fundamental readjustments that the country must have.

"During the war, the necessity for the elimination of unnecessary employment, the elimination of the use of unnecessary materials, benefited many industries. There grew up a far different cooperation in industry in the simplification of a great many processes and products. The experience gained at that time, I think, convinced most manufacturers that there was something of permanent value in those ideas.

"There has been an attempt on the part of manufacturers since then in a hundred different directions to come to an agreement and conclusion for themselves that would meet these ends. There is the difficulty of entering into such agreements, the possibility that they comprise some violation of the trade Acts. This administration coming to Washington felt that it could perform a service to manufacturers if it acted as a center point around which their own cooperative action could take place.

"There are a number of industries in which the manufacturers are carrying on their own surveys and are in consultation with the Department, but to make any of this work effective does not lie entirely with the manufacturers, who must have the cooperation of outside groups. This is the first time that we have attempted to bring the groups together, first, the manufacturer, then those who dominate his consumption; so that I am in hopes that we can get results."

The Department of Commerce believes that with the help of the United States Chamber of Commerce it will be possible to see how far an agreement can be reached for the simplification of varieties.

MAIBOHM SALE POSTPONED

TOLEDO, Dec. 12—Further postponement of the reorganization sale of the Maibohm Motors Co. has been made until Dec. 27, due to the filing of a Federal tax claim. The original date set was Nov. 29, at which time, however, the claim was filed and postponement was taken until to-day.

Committee Appointed for Mexico City Show

Event Will Open April 16 When Easter Crowds Visit Capitol

NEW YORK, Dec. 12—The 1922 automobile show in Mexico City will open on April 16, a time at which, because of Easter, the city is filled with visitors from all parts of the Republic. Definite advices concerning the show have been received by *El Automovil Americano*, the Spanish automotive publication of the Class Journal Co., which supplement previous information that the automotive division of the American Chamber of Commerce of Mexico City had determined to hold such an exhibition next spring.

A strong committe of representative dealers has been named to supervise and direct the show, the automotive division of the chamber believing that such committee would assure careful and proper management and would obviate some of the mistakes made in holding the first Mexican show last spring.

The committee follows: James G. Shirley, American Motors Co.; William C. Benbow, Cia. Unida de Ventas, S. A.; V. S. Bowling, Shearer Electrical Construction Co., S. A.; S. L. Carrico, United States Rubber Export Co.; Charles B. Crowley, Mayfield Auto Co., S. A.; W. A. DeGress, Mohler & DeGress, Sucs, S. A.; Simeon F. Fuller, the Mexican Trading Corp.; Frank E. Moore; A. F. Robertson, Robertson Motor Co., S. A.; A. Villalba, Jr., Lamborn & Cia., and Carlos Wille, Cia., Automotriz Mecicana, S. A.

Chandler Directors Declare $1.50 Dividend

NEW YORK, Dec. 15—The directors of the Chandler Motor Car Co. at a meeting in Cleveland yesterday declared the regular quarterly dividend of $1.50 a share payable Jan. 1 to stockholders of record Dec. 24.

By this action they fooled the speculators who had been predicting that the dividend would be passed and who sold the stock short. The price declined to 45½ Monday but sold up to 52 yesterday. It is understood that the Chandler company did not earn the dividend but paid it out of surplus. It is felt that the earnings in the next quarter will justify this action.

Dent Parrett Elected Head of Tractor Company

CHICAGO, Dec. 13—Dent Parrett has been elected president of the Hicks Parrett Tractor Co. Parrett has long been identified with the tractor industry. He was the originator of the Parrett tractor and founder of the producing company. During the war he was associated with this work through his activities at the Holt plant in Peoria and the Chandler plant at Cleveland, where he served in the capacity of major in the army.

Since the war Parrett has devoted his time to working out engineering plans for tractor improvements and the development of a combination light tractor and cultivator to be sold at a price around $600. This model, with the improved models of the Parrett three and four-plow tractors, will be shown at the National Tractor Show at Minneapolis in February.

Gray Will Exhibit Cars During New York Show

DETROIT, Dec. 14—Gray Motor Corp. will exhibit two cars at the Commodore during the week of the New York show which, it is reported, will sell under $500. Drawings of the car seen in the offices of the company indicate a very high class looking product more commodious than the usual run of car in the extreme low priced class.

The plan of the company to assemble the car in assembly branches in principal cities of the country, means that it will be a specialized unit vehicle, and specifications are being placed with leading unit parts makers seeking the highest possible construction value in the price class.

If the plans of the company are carried through, unit parts makers will have an opportunity to participate in the manufacture of a car in the bottom price class.

Firestone Preferred Stockholders May Vote

AKRON, Dec. 14—Preferred stockholders of Firestone Tire & Rubber Co. will be entitled to vote at the annual meeting scheduled for Dec. 15, according to a circular letter mailed to shareholders. The reason assigned is that the ratio of net quick assets has not been maintained, which entitles both 6 per cent and 7 per cent preferred to voting powers.

It is only because of the fact that charge-offs for inventory depreciation and complete absorption of losses have been made that net quick assets are below ratio. Inventories have been placed at or under market levels.

All losses have now been absorbed, the company is in a sound financial position and in the best operating and sales position in its history, according to officials.

Firestone Tire & Rubber has $10,000,000 each of 6 per cent and 7 per cent preferred stocks outstanding. It is provided that net quick assets equal to 150 per cent of 6 per cent preferred outstanding and 250 per cent in net tangible assets must be maintained. It shall also maintain net quick assets equivalent to 125 per cent of the 7 per cent preferred and 200 per cent in net tangible assets. Each class of preferred stock shall have voting power in the event that the ratio of assets is not maintained.

Peruvian Dealers Reduce All Stocks

Accessories and Tires Scarce—No Excess of Popular Priced Cars

LIMA, PERU, Nov. 30 (*By Mail*)—During November dealers in automobiles have either advertised reductions in price or quickly made reductions when effecting sales. Little by little the stock of automobiles, accessories and tires has been reduced, until now in the popular priced car (Ford) there is no excess stock; and in the accessories and tires of the popular priced cars, there is scarcity rather than excess stock.

Two unfavorable, one neutral and two favorable symptoms may be noted in the general situation in Peru to-day. In the valley of Chicana, the heart of the sugar industry, there is industrial discontent, which has hurt the sugar trade and consequently adversely affected business in general. The political uprising against the Government in Iquitos, and the discontent of the native Indians in the region of Puno, although not serious so far, may spread.

The neutral element is the proposed loan from North America. A group of financial experts from the United States is here now examining the resources of the country to see if they warrant the amount sought. As long as there is hope of securing the loan, the present condition will not grow worse; and until the loan is secured present conditions will not improve. So the neutral element is perhaps the predominant one in the Peruvian business world to-day.

The two favorable features are increased movement in business as indicated by heavier advertising in the daily papers. The number and size of the advertisements appearing to-day are far greater than three months ago. Automobiles and accessories come in for their share of the increased advertising.

AUTOCAR REDUCES PRICES

ARDMORE, PA., Dec. 14—The Autocar Co. has announced a reduction in prices on its standard truck, effective Jan. 3. The type F with a 97-in. wheelbase is reduced from $2,300 to $1,950 and type G with a 120-in. wheelbase from $2,400 to $2,050. The new 2-ton heavy duty truck with a 114-in. wheelbase is priced at $2,950 and with a wheelbase of 138 in. at $3,075. The new 5-ton heavy duty truck with a 120-in. wheelbase is listed at $3,950 and with a 156-in. wheelbase at $4,100.

GARFORD PRICES REDUCED

ELYRIA, OHIO, Dec. 12—The Garford Motor Truck Co. has reduced prices on its entire line of trucks, the cuts ranging from $100 to $340. The 1¼-ton chassis at $1,990 is $100 under previous price and the 2-ton chassis is reduced $340 from $3,190 to $2,750.

Bureau of Civil Aviation Proposed

Automobile Industry Approves Bills Introduced in Both Houses of Congress

WASHINGTON, Dec. 12—Two bills have been introduced in Congress, one by Senator Wadsworth of New York, and the other by Representative Hicks of New York to create a Bureau of Civil Aviation in the Department of Commerce to encourage and regulate the operation of civil aircraft in interstate and foreign commerce, and for other purposes.

The bills are practically the same and have the approval of members of the automotive industry interested in aviation, engineers and others, including the National Advisory Committee on Aeronautics, the Bureau of Aviation of the Navy, and the Army Air Service. These measures were drafted in accordance with the recommendations of the President in his message to Congress for the creation of such an establishment. Similar bills were introduced at the extraordinary session of Congress last summer.

These legislative measures provide for the establishment of the bureau with a commissioner of civil aviation as head, who will receive a salary of $7,500 per annum. The bureau will be charged with the responsibility of fostering civil aviation in every way possible and of co-operating with the industry and governmental agencies.

Provisions of Measures

The measure provides that it shall be the duty of the bureau

(a) To inspect the design and construction and, if approved, to license the operation of civil aircraft, in order to safeguard life and property.

(b) To regulate the navigation and operation of civil aircraft through the establishment of aerial traffic rules and regulations, in order to safeguard life and property.

(c) To designate, approve, and lay out air routes.

(d) To establish and encourage the establishment of landing fields and air stations.

(e) To make recommendations to the Weather Bureau as to the necessary meteorological service.

(f) To study the possibilities for the development of civil aviation in the United States, and to collect and disseminate information in relation thereto.

(g) To investigate, record and make public the causes of accidents in civil aviation.

(h) To exchange with foreign Governments, through existing commercial attachés, information pertaining to civil aviation.

(i) To operate such aircraft as the Secretary of Commerce may deem necessary for inspecting, licensing, regulating, and controlling the operation of civil aircraft, and the establishment of air routes, landing fields, and air stations.

(j) To prescribe the manner of using air routes and to utilize air navigation facilities and appurtenances.

(k) To prepare and maintain a comprehensive survey and inventory of all industrial and civil aeronautical resources under the jurisdiction of the United States.

SEC. 4. That, subject to the approval of the Secretary of Commerce, and for the purpose of making effective the provisions of this Act, the Commissioner of Civil Aviation shall by regulation provide for—

(a) Licensing pilots and such other persons engaged in the navigation or operation of civil aircraft as may be required for the public safety, and upon good cause the suspension or revocation of such licenses.

(b) The registration, identification, inspection, certification, or licensing of all civil aircraft, and upon good cause the suspension or revocation of such licenses.

(c) The registration, identification, inspection, certification, or licensing of all civil landing fields or air stations, and upon good cause the suspension or revocation of such licenses.

(d) The conditions under which civil aircraft may be used for carrying and transporting persons or property or for the operation of any civil aerial service whatsoever and the licensing of any such service.

(e) The prohibition of the navigation of civil aircraft over such areas as may be specified for military, naval, postal, or other purposes, either temporarily or permanently, and either absolutely or subject to such exemptions or conditions as may be prescribed.

Aeronautical Committee Makes Recommendations

WASHINGTON, Dec. 12 — Recommendations for Government development and regulation of aviation are contained in the annual report of the National Advisory Committee for Aeronautics, in which it is observed that if there were transcontinental airways, equipped with landing fields, airdromes and meteorological stations, private enterprise would soon see to the establishment of passenger and freight services. It is added, however, that "the first national airways should be carefully planned to serve military as well as civil needs."

Aviation, in the committee's opinion, should be under the direction of a special bureau in the Department of Commerce, which should both control and foster its development.

One of the points to which special importance is attached is the supply of helium. The sources of this supply are limited, but the United States has a practical monopoly of them. As yet, however, the storage of helium in large quantities presents considerable technical difficulties, and the gas is said to be escaping into the atmosphere at a rate sufficient to fill four large airships weekly. The committee accordingly recommends that the Government acquire and seal the best helium producing fields until the experiments now going on for the development of helium-using airships have progressed further.

OHIO TO HOLD COURSES

COLUMBUS, Dec. 12 — Practical courses in the operation of tractors and gasoline engines, under the auspices of the Ohio Department of Education will be given in many sections of the State.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

During the past week a slight stiffening in the rates for call money was shown. The quotations ranged from 4½ per cent to six per cent as compared with 4½ per cent to 5½ per cent for the previous week. There was little change, however, in the rates quoted for fixed date maturities from sixty days to six months, quotations ranging from 5 per cent to 5¼ per cent as against a fixed rate of 5 per cent in the previous week. Prime commercial paper remained unchanged at 5 per cent to 5¼ per cent. In general, trading was dull with no special features, and the volume of business transacted was light.

The Federal Reserve statement as of Dec. 7, 1921, showed a further increase in the total reserve ratio from 72.7 per cent to 73.1 per cent. Inter-Reserve Bank borrowing is rapidly being eliminated, according to the last statement, which shows rediscounts of only $6,175,000 held by the Boston bank and chargeable against the Dallas and Atlanta institutions. The Richmond bank has settled its entire indebtedness to the other banks. A year ago these three Southern banks owed over $82,000,000.

The total reserves of the New York institution decreased $37,458,000, while total bills on hand increased $32,087,000. Total earning assets showed an increase of $29,186,000, and Federal Reserve notes in circulation $10,126,000. The ratio of total reserves to deposit and Federal Reserve note liabilities combined decreased from 83.6 per cent to 81.6 per cent, while the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against deposit liabilities, decreased from 137.5 per cent to 130.7 per cent.

One of the most noteworthy features in the week's financial markets was the further strength and continued activity of bonds, with a strong demand for both old and new securities. During the week, Victory 4¾'s sold above par.

On Dec. 12, the Department of Commerce announced the United States foreign trade figures for November. The value of exports during November, 1921, totaled $295,500,000 as compared with $343,597,000 in the preceding month and $676,528,000 in November, 1920, while imports for the month of November amounted to $211,300,000 as compared with $188,080,000 in October and $321,209,000 in November, 1920. Exports have not been so small since August, 1915, when the total amounted to $260,609,995.

This gradual reduction in the excess of exports through a steady increase in imports, together with the improved favorable trade balance in British foreign trade, may be one of the fundamental reasons for the marked advance in sterling exchange, which on Dec. 12, at $4.24⅛, demand quotation, set a high level for the year and the highest since the last week of September, 1919.

INDUSTRIAL NOTES

Rauch & Lang, Inc., has increased its production output of electric cars. **H. H. Doering,** general sales manager, has returned from an extensive trip through the West, during which he established a number of new agencies and put those previously established on a more active basis. He reports Pacific coast prospects as particularly encouraging. The company has recently made some large sized shipments to Pasadena and other coast points, and is also doing a good business in the Chicago and Washington, D. C., districts. Its new models will be ready soon after the first of the year.

Western Reserve Mills Co. of Georgia, manufacturer of automobile tire fabrics, has completed development work at its large plant at Quitman, Ga., and started operations early in December. The plant is owned by the Mason Tire & Rubber Co., being acquired recently by outright purchase and the fabric manufactured will be used entirely in Mason tires. About $85,000 worth of new machinery was installed in the plant. The same company also acquired by purchase a textile plant at Millen, Ga., which will be used for the manufacture of tire fabric.

Huntington Automotive Co. has been formed to take over the Borland piston works, of Huntington, Ind., near Fort Wayne. The new concern will manufacture automobile parts and accessories. The company has a capital stock of $100,000 and the directors are as follows: Harry L. Slack, Fort Wayne; Jacob B. Neff, Milford; Henry M. Myers, Huntington; William S. Gordon, Converse; George Sever, Columbia City; J. Archie Borland, Huntington; John Betz, Huntington; Perry Miller, Roanoke and Ora and Wilber Highley, Converse.

Inner-Guard Tube & Rubber Co., organized in St. Louis to manufacture and market an inner tube with special puncture resisting qualities, has opened offices in the Bank of Commerce Building that city as a preliminary to locating a factory. Louis Goodhart is president of the company. The other officers are Paul Van Tuyl, vice-president. John H. Heitman, secretary and John S. Hatz, treasurer. The directors are Lew Burnham, R. C. Hinds, Walter Heintz, L. H. Boyd and Charles R. Rawlin.

B. J. S. Products Corp., New York, has elected new officers as follows: President, John C. Baker, consulting chemist of Wallace & Tiernan, Belleville, N. J.; vice-president, S. S. Parsons, Philadelphia; secretary-treasurer, Francis J. Tietsort, New York. The corporation reports that it has made considerable strides in obtaining important new business in the last 60 days, and states that production is steadily increasing under new sales direction.

Kelly-Springfield Tire Co. officials announce that all employees at the Cumberland, Md., plant who were given a furlough Nov. 11, will be taken back gradually and the plant which has been operating four days a week will be put on a full time basis. Improved business conditions are stated to be responsible for the resumption.

W. A. Thompson, president of the Crisp County Lumber Co., of Cordele, Ga., heads a new company formed in that city to establish a plant for the manufacture of automobile storage batteries. The main unit is under construction and will be completed in time to start operations by the first of the year.

Miller Rubber Co. has opened a factory branch in St. Louis to handle the wholesale or dealer business on Miller tires, tubes and rubber goods in the St. Louis district. The Fishell Tire Service Co. will continue to retail and give service on the tires in the city. The manager of the branch is G. K. Meeks.

Mueller Electric Co., Cleveland, has disposed of that part of its business under which it acted as manufacturer's agent to J. Ellis Black, a former employee. The sale was deemed advisable in view of the growth of the manufacturing end of the company.

Authorized Motor Parts Corp., incorporated in Missouri has opened a service station in St. Louis for the Continental motors, Spicer propeller shafts and universal joints, Borg and Beck clutches and parts and Timken commercial axles.

Earl Philadelphia Motor Car Co. has been appointed distributor in the Philadelphia district for Earl motor cars. John C. Baggott is president; R. M. McCormick, vice-president and John R. Thomas, secretary and treasurer.

Chadick, DeLamater Corp., authorized distributor for Continental Motors parts, has signed a contract with the Warner Gear Co. of Muncie, Ind. to represent it for service parts in the New York Metropolitan territory.

London Motor Plow Co. is making plans for the removal of its plant from London, Ohio, to Springfield. E. H. Daniels, the inventor of the plow, is backed by Columbus and Springfield interests, it is understood.

Springfield Coach Works, Springfield, Mass., plans an early enlargement of its factory. Orders for bodies for the Rolls-Royce, Lincoln, Mercer and Cadillac companies have kept the concern busy at production.

Buda Engine Service Co., St. Louis, has been appointed by the Buda Engine Co., Harvey, Ill., its official representative and authorized parts distributor in Eastern Missouri and Southern Illinois.

American Southern Motors Corp. has secured an amendment to its charter changing its name to the Irving Automobile Co. This company manufactures the Vaughan car, custom built.

Lorenz Bros. has been appointed Franklin distributor in Eaton, Ingham, Shiawassee and Clinton counties, Michigan, with headquarters in Lansing.

Mutual Truck Co. plant, Sullivan, Ind., will be offered at public sale by the receiver on Dec. 22.

European Race Drivers Coming to Indianapolis

PARIS, Nov. 28 (*By Mail*)—Victor Hemery, Albert Guyot, Louis Wagner and Pietro Bordino are among the European veteran race drivers who may be expected to take part in the 500-mile race at Indianapolis. Hemery and Guyot are members of the French Rolland-Pilain team and are now assisting in the production of a set of 122-cubic inch cars which have been entered for the French Grand Prix race. Five cars are being built, two of them being intended for Indianapolis and the three others being reserved for the French classic.

Louis Wagner and Pietro Bordino are negotiating with the Fiat Co. of Turin to send two of their eight-in-line, 183-cubic inch racing mounts to Indianapolis.

FINANCIAL NOTES

Durant Corp. is offering a limited number of shares of common stock of the Continental Motors Corp. at $6 a share. Terms of payment are $2 a share with application and $2 on the fifteenth of each month thereafter until the contract is completed. No subscriptions will be accepted from any one individual for less than five or more than 20 shares.

General Jobbing Co. creditors, Davenport, Iowa, to the number of twenty, have filed suits against the company to collect more than $7,000 on notes. The securities were issued a year ago at the time of the reorganization. Charles B. Kaufman and Charles C. Kaufman are co-defendants in the suit. The company was formerly the Mid-West Motors Corp.

H. H. Franklin Mfg. Co. announces that its preferred stock will be withdrawn from sale on Dec. 17. Company officials state that since the stock was first placed on sale, Oct. 6, 1919, preferred and common stock to the amount of $6,289,425 has been sold direct to the public up to Dec. 1 of this year.

Zenith Tire & Rubber Co.'s affairs will be thoroughly investigated by the Federal court at Toledo. Application for a receiver has been made but before definite action is taken the court will require that all books be brought before it and officers testify as to conditions.

Portage Rubber Co., has been incorporated with an authorized capital of $1,500,000 to manufacture casings and tubes. The incorporators are Francis Seiberling, Robert Guinther, J. B. Huber, R. L. Brannan and C. E. Hamlen.

Preston Motors Corp., Birmingham, Ala., a Delaware corporation, has filed with the Georgia Securities Commission an application to sell $250,000 of its preferred capital stock in Georgia, authorized capitalization $10,000,000.

International Motor Truck Co. declared the regular quarterly dividends of $1.75 on the first and second preferred stocks, both payable Jan. 1 to stock of record Dec. 20.

Hupp Motor Corp. declared its regular quarterly dividend of 1¾% on preferred stock, payable Jan. 1 to stock of record Dec. 20.

Reo Motor Car Co. has declared a regular quarterly dividend of 2½% on its capital stock, payable Jan. 2 to stock of record Dec. 15.

Pioneer French Aviator Leblanc, Dies in Paris

PARIS, Nov. 27 (*By Mail*)—Alfred Leblanc, pioneer aviator, and general manager of the Bleriot Aviation Co., died here this week at the age of 52. Leblanc, who was a spherical balloon enthusiast and established a world's distance record in 1907, was one of the first men in France to take up flying.

CADILLAC GIVES SILVER FOBS

DETROIT, Dec. 14—Cadillac employees numbering 270 were given silver watch fobs at a dinner Monday night in token of their having completed five years continuous service with the company. There are now 1174 five year men.

MEN OF THE INDUSTRY

William H. Klett, for the last three years connected with the John N. Willys Export Corp. has severed his connection with the corporation to become manager of the automobile department of Mohler y De Gresa Sucs., South American distributor for the Overland, Willys-Knight, Chalmers and Cadillac cars in the City of Mexico. Klett has been representing the export corporation in Mexico and Cuba with headquarters in the City of Mexico for the last two years. Prior to that he was identified with the Carhart Motor Co. of Oklahomo City, and, later as sales manager for the Overland Springfield Motor Co. at Springfield, Mo.

John Yoke has been named as commercial manager of the Handley-Knight Co. of Kalamazoo. Yoke was formerly connected with the wagon end of the Studebaker Co. and left that branch in 1910 to become connected with the newly created automobile division. In 1913 he became associated with Maxwell, first as special representative and later as sales manager. He joined the Willys-Overland organization in 1916 and until now has had charge of branch sales activities in Toledo.

G. B. Sharpe for the past fifteen years identified with the farm machinery industry, has been appointed advertising manager of The Burroughs Adding Machine Co. For the last two and a half years Sharpe has been assistant general sales manager of the Cleveland Tractor Co. Previous to going to Cleveland, Sharpe was with the De Laval Separator Co. in New York for nearly ten years and, before then was advertising manager for Studebaker Corp. for four years.

L. C. Alexander has been appointed manager of the Western Ohio territory with headquarters in Columbus for the Eclipse Mfg. Co., manufacturer of the Hercules spark plug. Alexander was formerly Cincinnati branch manager of the Goodyear Tire & Rubber Co., has been connected with the Firestone Tire & Rubber Co. handling national accounts and has been factory district representative of the Pierce-Arrow Motor Car Co.

P. T. Irvin, formerly manager of the drill division of the Greenfield Tap and Die Corp., Greenfield, Mass., has been placed in charge of the recently consolidated small tool and drill division of the corporation. For the past three years Irvin has been sales manager of the Lincoln Twist Drill Co. and prior to that was sales manager of Wells Bros. Co. of Greenfield.

George H. Layng has resigned as vice-president and manager of manufacturing of the Cadillac Motor Car Co. to accept the same offices and responsibilities with the Peerless Motor Car Co. Layng's service with Cadillac extended over a period of nearly 16 years. He joined the organization in 1905 as foreman of the chassis department, making single-cylinder cars.

Peter Brown and **Bernard R. Banks,** manager of the motor department of **Brown Brothers, Ltd.,** motor and cycle accessories firm in London, England, will be at the Belmont hotel, New York City, from Dec. 27. Their purpose in coming at this time is to visit the national automobile show in New York.

R. B. Kayser, formerly assistant sales manager of the Chevrolet Motor Co., located at the general offices, has resigned to accept a similar appointment with the Durant Motor Car Co. of New York. Kayser has been associated with the Chevrolet organization for the last eight years.

Morris Jones, who has been with the tractor division of the Ford Motor Co. at the Dearborn and Highland Park plants, has organized with John R. Weaver the firm of Morris Jones, Inc., which will be an additional Ford and Fordson dealer in Philadelphia in the Overbrook district.

Julian M. Case, for the past few years identified with Scripps-Booth, United Motors Co. and the Garford Motor Truck Co. as advertising manager, has joined the Fred. M. Randall Co., advertising agency in Detroit, as vice-president in charge of sales and merchandising.

L. R. Clare, formerly connected with the Hudson Motor Car Co. and industrial engineer of Chicago and San Francisco, has become connected with the Leach Biltwell Motor Car Co. Clare will have supervision of the personnel at the factory of the Leach company.

L. B. Southerland has been appointed general manager of the Chicago branch of the Cadillac Motor Car Co., and **C. A. Englebeck** has been promoted to branch sales manager succeeding him. **L. B. Dimond** has been named assistant sales manager.

Bertram A. Doran, formerly assistant branch manager in the Orient for General Motors Export Corp. has been appointed special representative of the export department of Maxwell-Chalmers in the Far East.

W. J. Shay, for the last seven years associated with the Champion Spark Plug Co. of Toledo, has been appointed sales manager of the automotive division of the Columbus McKinnon Chain Co.

L. M. Bradley, former general manager of the Motor & Accessory Manufacturers Association, has joined the organization of the C. G. Spring Co., Kalamazoo, Mich.

American Turn-Auto Co. Obtains Patent Rights

COLUMBUS, Dec. 14—The American Turn-Auto Co., which was chartered under Ohio laws but later formed into a partnership consisting of Howard M. Bettett and R. C. Penfield, the latter of Bucyrus, has taken over the American rights and patents formerly held by the Turn-Auto Co. of Columbus, manufacturer of a device to turn an automobile over on its side while making repairs.

The office is located at 40 West Gay Street and the device is being manufactured by the Hatfield, Penfield Steel Co. of Bucyrus under contract. The Turn-Auto Co. does not go out of existence as that concern owns foreign rights to the device.

SLIGHT INCREASE IN DALLAS

DALLAS, Dec. 14—The automobile business during the first 15 days of the last month of the year was said by retailers here to be about as good as that of any 15 days of the year. There had been increases in sales, as applied to both new and used cars, during the past few weeks by most of the dealers of Dallas and north Texas. The actual retail sales for the first 15 days of December showed a slight increase of a similar period for November. Dealers said some of the business was holiday trade.

METAL MARKETS

Activity in the metal markets, so far as business for immediate delivery is concerned, has dwindled to negligible proportions. Consumers are averse to taking on a single pound of metal which they do not need for immediate operating schedules, all wanting to keep raw material inventories as low as possible. A somewhat different viewpoint characterizes the situation with reference to first quarter 1922 requirements.

Pig iron consumers have begun to place contracts so as to be covered, at least in part, for the first three months of the coming year and, while automotive foundries have not been very prominent in the market so far, negotiations are now pending in many instances with a view to providing adequate iron for the first three months' melt of 1922. The outlook as to pig iron prices, largely wrapped up as it is in the shaping of freight rates, is one thing and the extent of the supply quite another.

The blast furnaces now in operation have been able to dispose of their output as the result of the routine demand of the last few months and the placing of a fairly satisfactory quota of orders for first quarter 1922 deliveries implies the going into blast of a number of furnaces that had been idle during the better part of the year. Obvious it is that the pig iron producers are playing close to the cushion in the matter of supply and that they will not permit any excess of stocks over the demand to bear down on values, regardless of what other factors may contribute toward a further downward readjustment of prices.

On the surface the steel market, as is usually the case immediately preceding the holiday season, has gone to sleep. Far-seeing buyers, however, are making good use of the present by attending to the preliminaries of the actual placing of orders. They are sounding the market in a cautious way and, while they are withholding the signature on the dotted line for the time being, they are prepared to reap the benefits that come from being the early bird in a buying movement.

Both steel producers and consumers have come to the conclusion that the one factor which continues to retard the return to completely normal conditions is the continuation of unnaturally high freight rates and the producers are agreed with the public carriers that these rates can not be pared adequately except through further wage cuts.

Pig Iron.—Automotive interests are for the most part deferring the placing of representative orders for first quarter 1922 shipment, foundries being generally supplied with enough iron to carry them beyond the middle of next month. The market is rather steady than strong.

Steel.—Prices remain generally unchanged with the demand seasonably restricted. So far not enough representative 1922 business has been placed to afford a clear picture of the trend of values.

Aluminum.—Rumors are afloat that heavy tonnages of virgin ingots held by Detroit interests are being pressed on the market at sacrifice prices, but it is impossible to verify these reports. The sale of 350,000 lbs. of aluminum castings (now at the International Motors Co. plant in Long Island City) by the Government is also a somewhat depressing market factor. Sheets are in fair demand but sellers and buyers are hard to get together on prices.

Copper.—The market has turned quiet and easier.

Calendar

SHOWS

Jan. 7-13—New York, National Automobile Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 9-14—New York, Motor Car Body Exposition, Automobile Body Builders Association, Twelfth Regiment Armory.

Jan. 28-Feb. 4—Chicago, Automobile Salon, Hotel Drake.

Jan. 28-Feb. 4 — Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

Feb. 6 to 11 — Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11 — Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

FOREIGN SHOWS

March, 1922 — Santiago, Chili, Annual Automobile Show.

April 16—Mexico City, Annual Automobile Show, Auspices of the Automotive Division of the American Chamber of Commerce.

April 22-May 1—Prague, Czecho-Slovakia, Fourteenth International Automobile Exhibit.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Associcao Automobilista Brazileria.

CONVENTIONS

Dec. 20—Philadelphia, American Society of Mechanical Engineers.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

Jan. 30-31—Chicago, Fifth Annual Convention, N. A. D. A., La Salle Hotel.

Jan. 30-Feb. 2—Boston, Sixth Annual Conference of the International Delivery Association, Copley Plaza Hotel.

June 11-15—Milwaukee, Annual International Convention of the Associated Advertising Clubs of the World.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

S. A. E. MEETINGS

Detroit, Dec. 23, Feb. 24, Mar 24, April 28, May 26.

New York, Jan. 10-13, 1922—Annual Meeting.

Chicago, Feb. 1

Minneapolis, Feb. 8-9—Annual Tractor Meeting.

Appraise Lincoln Physical Property

Receiver Has Detroit Figures—Work on Eastern Holdings Not Completed

DETROIT, Dec. 14—Whether Lincoln Motor Co. is to be reorganized and continue the manufacture of motor cars or is to undergo dissolution, will depend largely upon the outcome of the hearing for the cancellation of the $4,500,000 supplementary Federal tax assessed by the Treasury Department, which will be moved this week by the Detroit Trust Co., Lincoln receiver.

The attitude of the men who have the disposition of Lincoln in hand will be guided to a large extent by the outcome. Should the taxes be waived, or reduced to a figure compatible with the power of the company to pay, reorganization is confidently looked for.

Creditors Meet Dec. 28

The appraisal of the physical properties in Detroit has been completed and the figures are in the hands of the receiver. These will be filed in Federal court here and presented in support of the tax appeal at Washington. The filing has been delayed pending the completion of appraisals by ancillary receivers in the East, where the company has properties aggregating several hundred thousand dollars.

A creditors' meeting has been formally fixed for Dec. 28, by which time it is expected determination will be made on the tax claims. The company's financial condition as of Nov. 8 will be presented and definite action decided upon.

Sales of cars at the plant are continuing at the rate of three a day.

CZECHO-SLOVAKIA ACTIVE

NEW YORK, Dec. 12—A communication from the Automobile Club of Czecho-Slovakia with headquarters at Prague indicates that there is considerable automotive activity in that country. The 14th international automobile exhibition will be held at Prague, April 22 to May 1.

New Tariff Regulations Cover Canadian Shipments

WASHINGTON, Dec. 12 — Federal authorities have called upon postmasters throughout the country to notify shippers that amendments to the Canadian tariff laws effective Dec. 31, should be noted. The regulations apply to freight, express and parcel post shipments.

The regulations apply to "all goods imported into Canada capable of being marked, stamped, branded, or labeled, without injury, shall be marked, stamped, branded, or labeled in legible English or French words, in a conspicuous place that shall not be covered or obscured by any subsequent attachments or arrangements, so as to indicate the country of origin. The stamping, branding, or labelling shall be as nearly indelible and permanent as the nature of the goods will permit."

NEW REO TAXI CHASSIS

DETROIT, Dec. 15—The Reo Motor Car Co. has developed a special taxi chassis which will be shown for the first time in the New York Reo branch the week of the New York show. The model is designed to meet the rough use to which a taxicab is subjected, with special attention to acceleration and brakes. The model is the design of H. T. Thomas, Reo engineer.

CHIEF READY FOR BIG OUTPUT

PORT HURON, MICH., Dec. 15—The Chief Motors Corp., which manufactures engines for the Whitney Tractor Co. at Upper Sandusky, Ohio, has completed the installation of machinery for the production of 500 engines a month. About 100 will be built in January and the organization will be expanded to take care of the larger production after Feb. 1.

ASK NEW GARY RECEIVER

INDIANAPOLIS, Dec. 15—Creditors of the Gary Motor Truck Co. appeared in Federal Court here to-day and asked for the appointment of a new receiver. Creditors of the company are said to be interested in a reorganization plan under which it is proposed to provide $150,000 new capital.

Conferences Held on Truck Loading

Connecticut Officials to Co-operate With Industry in Wiping Out Evil

HARTFORD, Dec. 13—Representatives of the National Motor Vehicle Conference Committee conferred here yesterday with Motor Vehicle Commissioner Stoeckl on the State law designed to prevent the over-loading of motor trucks. It was made clear to them that the State officials would co-operate to the fullest extent with the automotive industry in its efforts to wipe out the over-loading evil.

Ruling Led to Meeting

The conference was the direct result of the ruling by the Connecticut authorities that trucks will be permitted to carry more than their rated load whenever their makers will certify that their operation will be entirely safe with the heavier load. This ruling was made at the earnest request of truck operators, but it was opposed by the National Motor Vehicle Conference Committee, which was represented at the conference by D. C. Fenner, its chairman, and F. W. Fenn, secretary of the National Automobile Chamber of Commerce. They do not believe trucks should carry more than their rated load.

Maker's Word Accepted

It was explained by Stoeckl that if a manufacturer gave formal notice that a 3½-ton truck could safely carry a 5-ton load, the vehicle would be re-rated as of 5 ton capacity and would be taxed accordingly.

The Connecticut authorities contend that not only do over-loaded trucks seriously damage State highways, but also that they are a prolific cause of traffic accidents. It is asserted that the number of highway mishaps has decreased appreciably since rigid regulations against over-loading were adopted in that State.